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PC WORLD

October 1994

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Windows and DOS Utilities
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9 Color Printers From $300
Windows Database Shoot-Out
Telecommuting Tips

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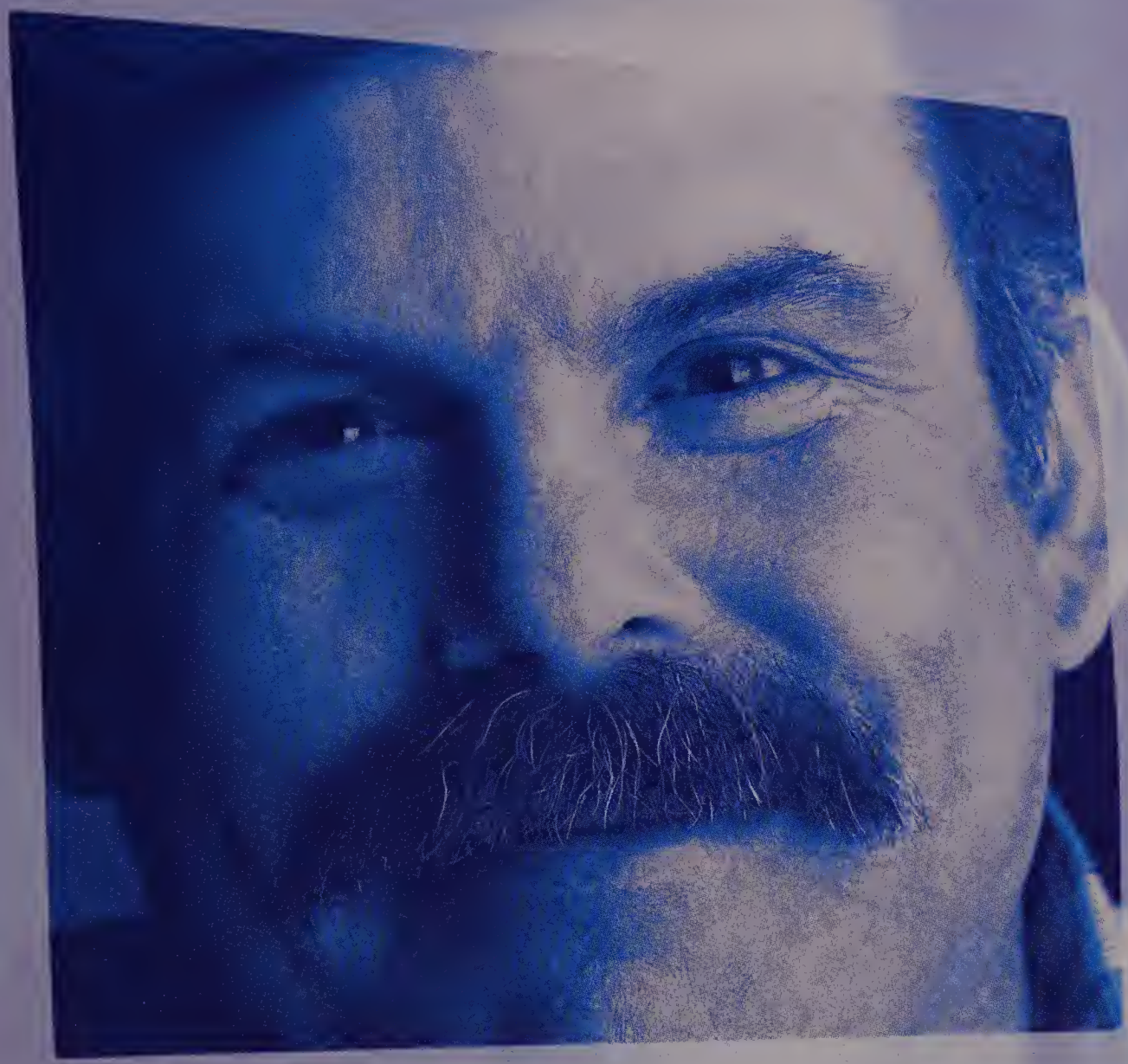
Sixty-five overnight packages. Tonight.



Two hundred and sixty-five hours this month.
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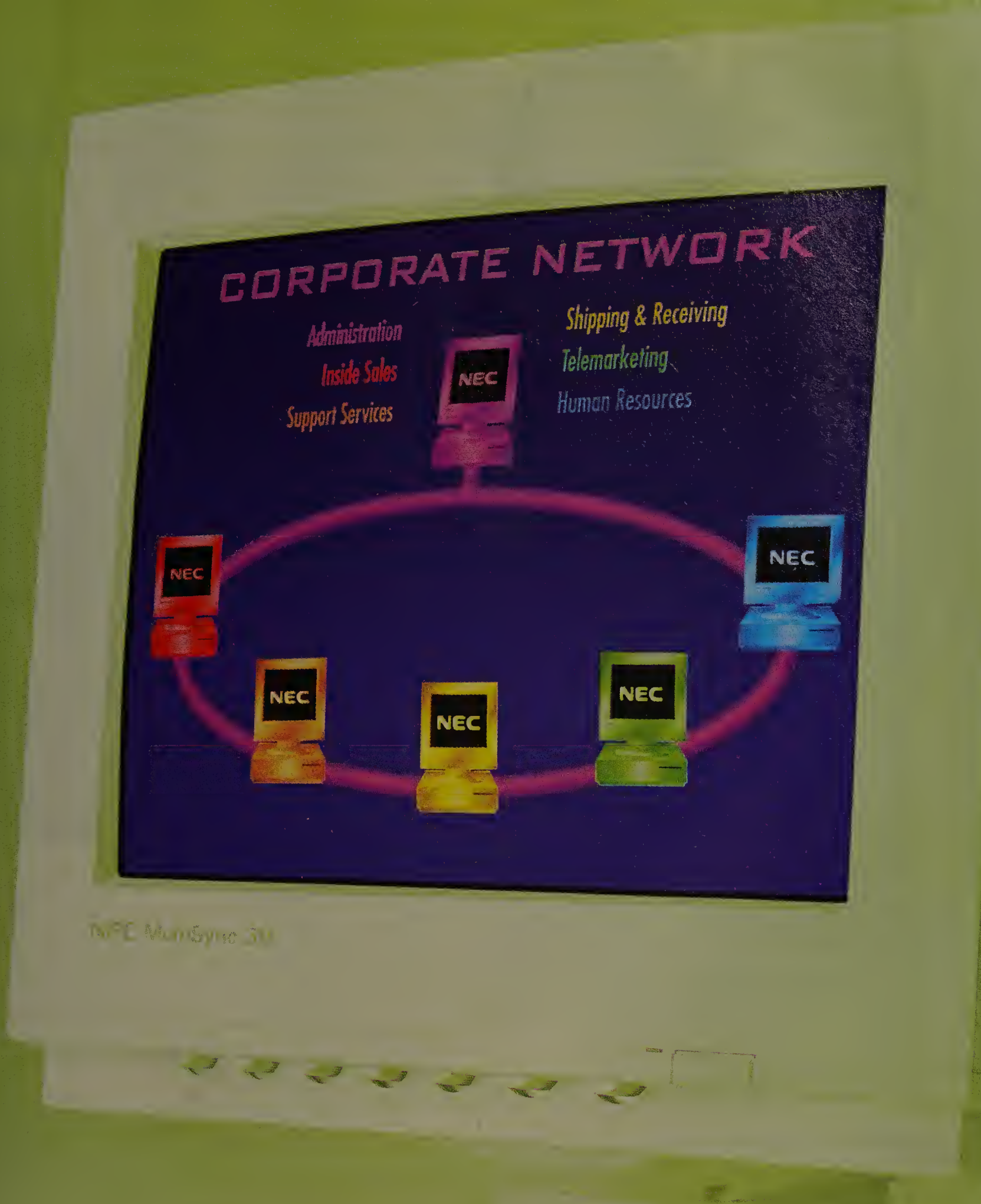

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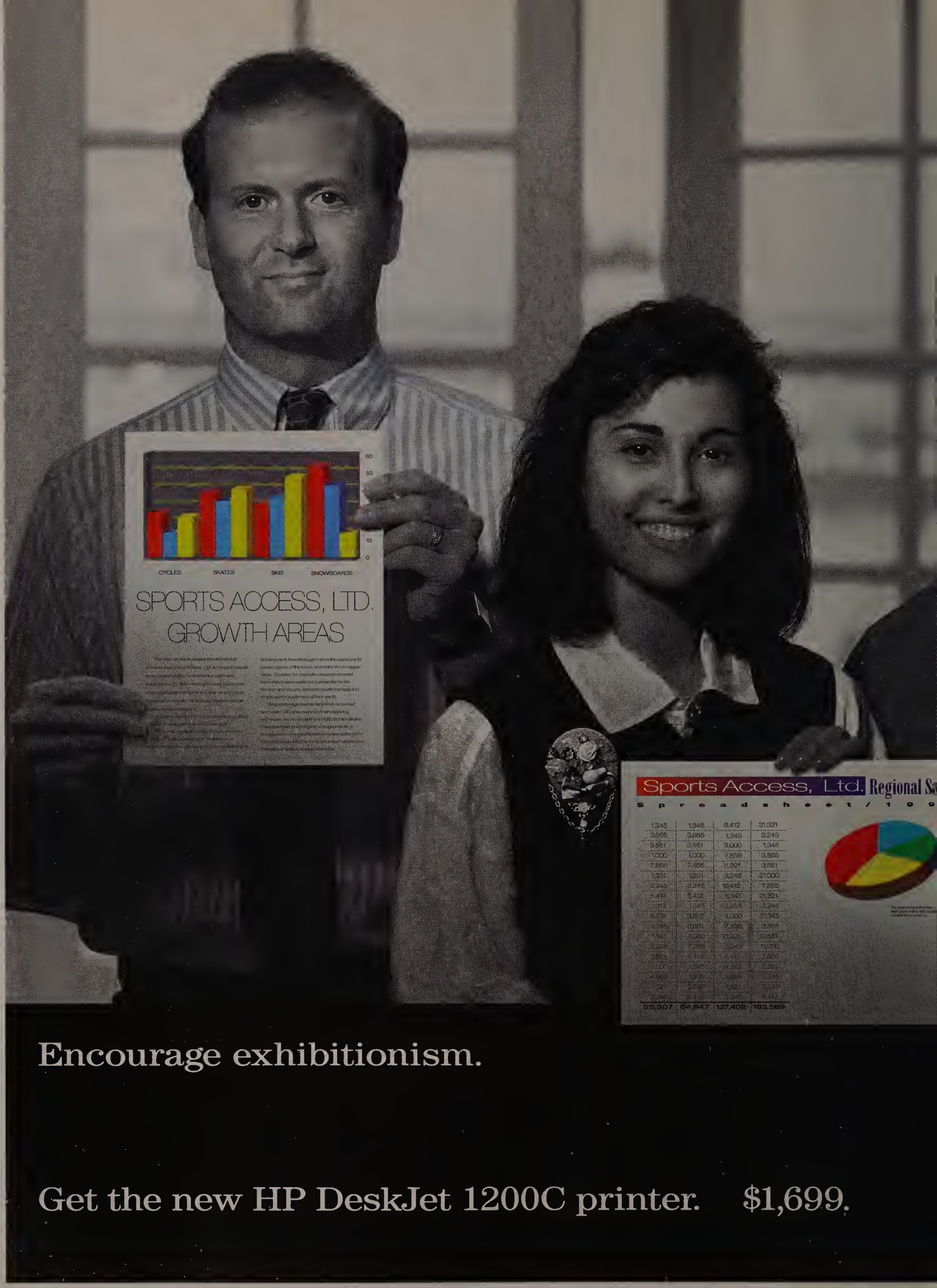

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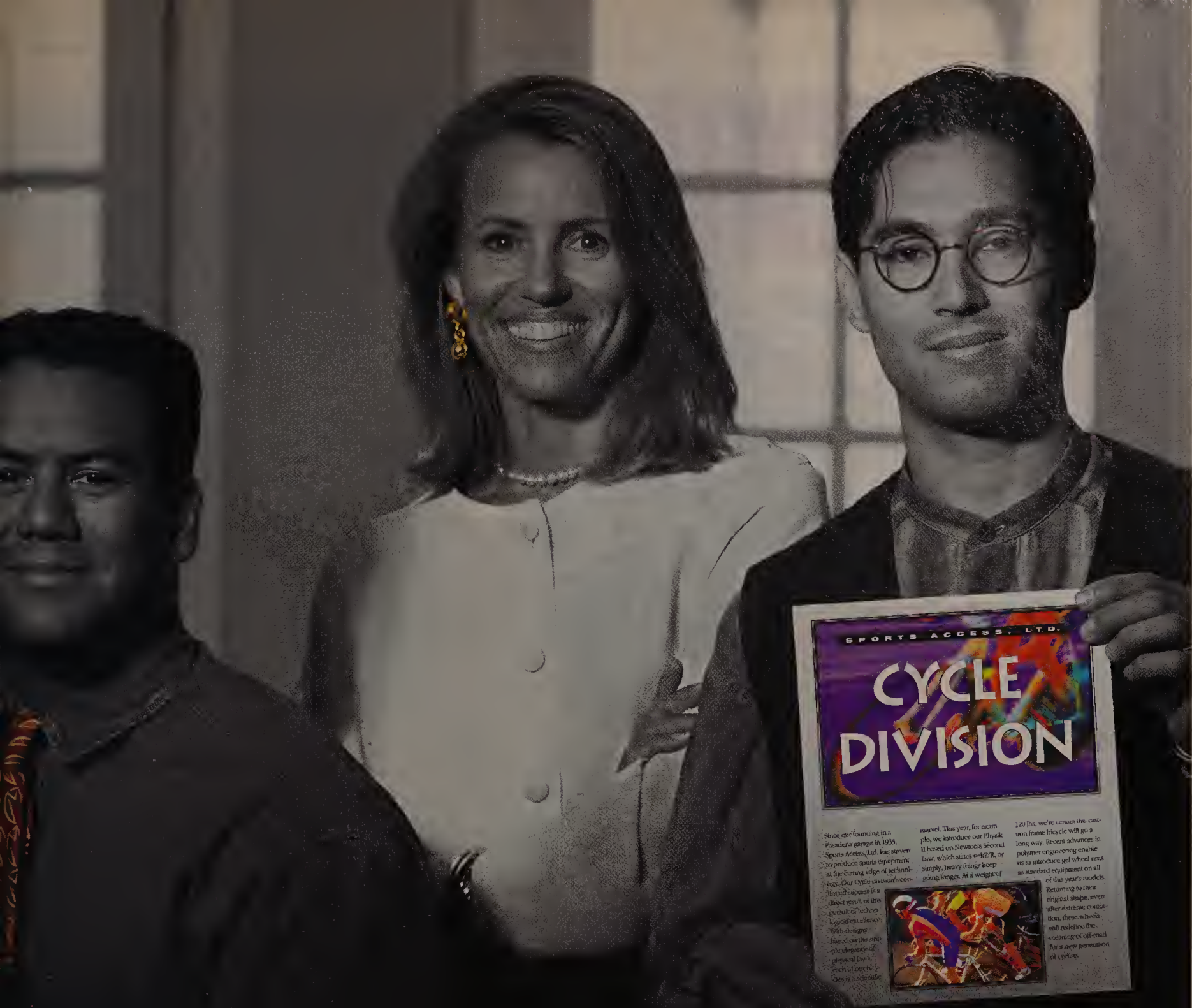

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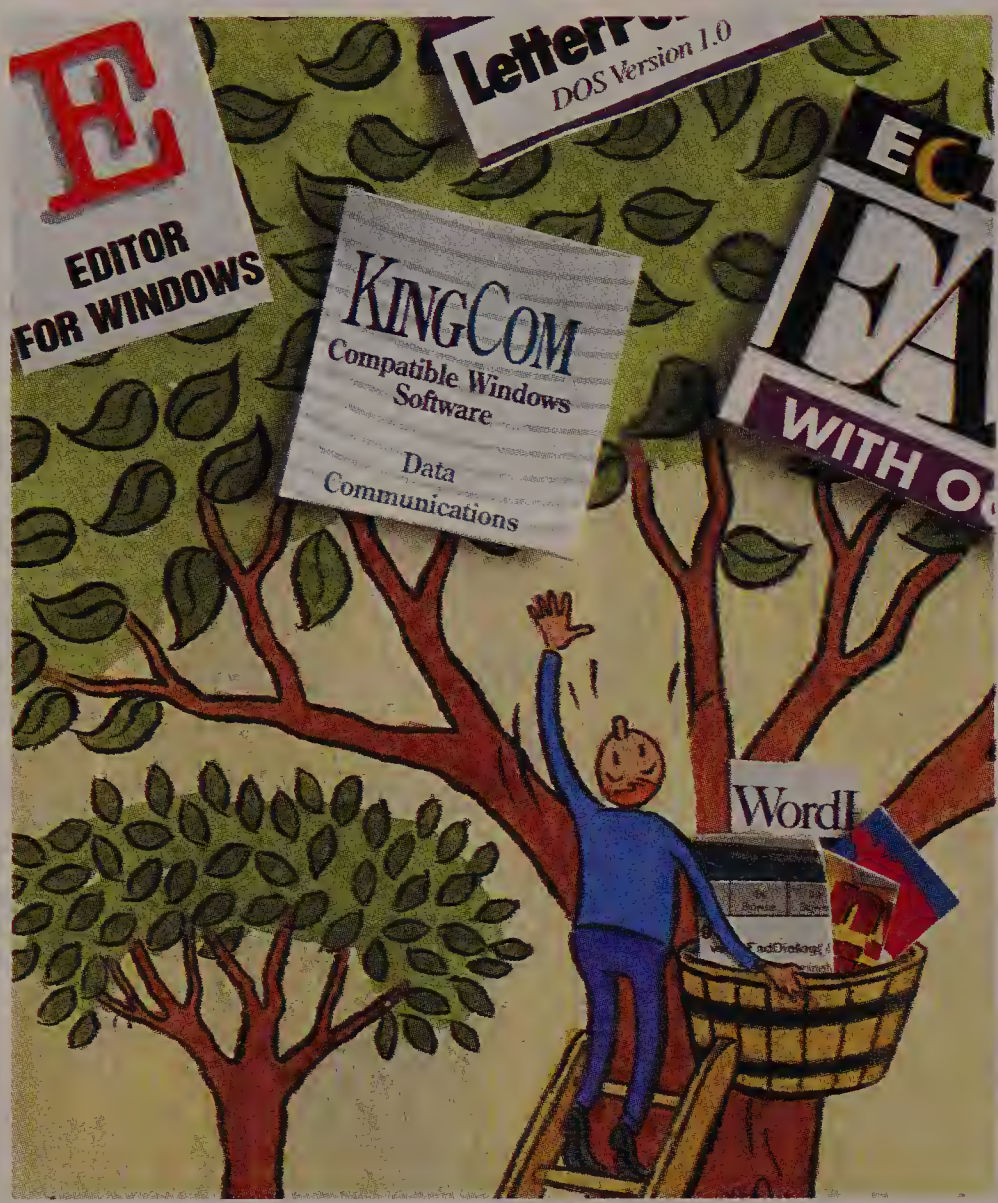

Cover Story

120 Super Software Bargains: 50 for $50 or Less
Who says cheap software is all arcade games and screen savers? Our team of shoppers scoured bargain bins and BBSs in search of productivity tools selling for $50 or less. Our handpicked surprises include special-purpose word processors, databases, spreadsheets, and utilities—all designed to boost your productivity without breaking your budget. Plus…a guide to shareware and freeware online and on CD-ROM.

Special Report: Multimedia

258 Sound Advice: Audio Components for PCs
The right peripherals can enhance the CD-ROM audio experience. Here's our guide to buying speakers, mikes, and headphones.

265 DISCoROMa
Current releases to keep you from an autumn funk include Science Adventure II, Microsoft Complete Baseball, and SimCity.

Cover photography by Stan Musilek, digital composition by TX Unlimited/San Francisco

Telecommuting

143 Kiss the Office Goodbye!
While commuters curse at traffic, 8.8 million telecommuters in the United States are working at home. Research suggests that these workers might be up to 20 percent more productive than when they are in the office. We examine how technology and corporate culture are redefining where and how we work.

Systems

164 Top 20 PCs: Prices Plunge, Performance Climbs
The cost of Pentium, DX4, and DX2 PCs is plummeting, with prices dropping as much as $940 since last month. And that's not all. We test record-breaking Pentium-90, Pentium-66, and notebook PCs. This month's best: Dell Dimension XPS P90, Diamond DT 486-66, Compaq LTE Elite, and IBM ThinkPad 500.

Graphics Boards

207 Top 10 Windows Accelerators: Price Cuts Shake Up List
Competition heats up as prices continue to drop and new graphics boards struggle to break into the Top 10.

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Micron's P100PCI PowerStation: stellar performance, earthshaking price of $3798.

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Conner's low-cost TapeStor 420 finally breaks the 250MB backup barrier.

60 Secrets to Building an All-Star Team
Stop! End the onslaught of E-mail and meetings with new work-group software.

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Microsoft's $99 keyboard debuts.

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Reform bogs down, software speeds up.

72 Microsoft Settles: Business as Usual
Who's the real winner—Microsoft or you?

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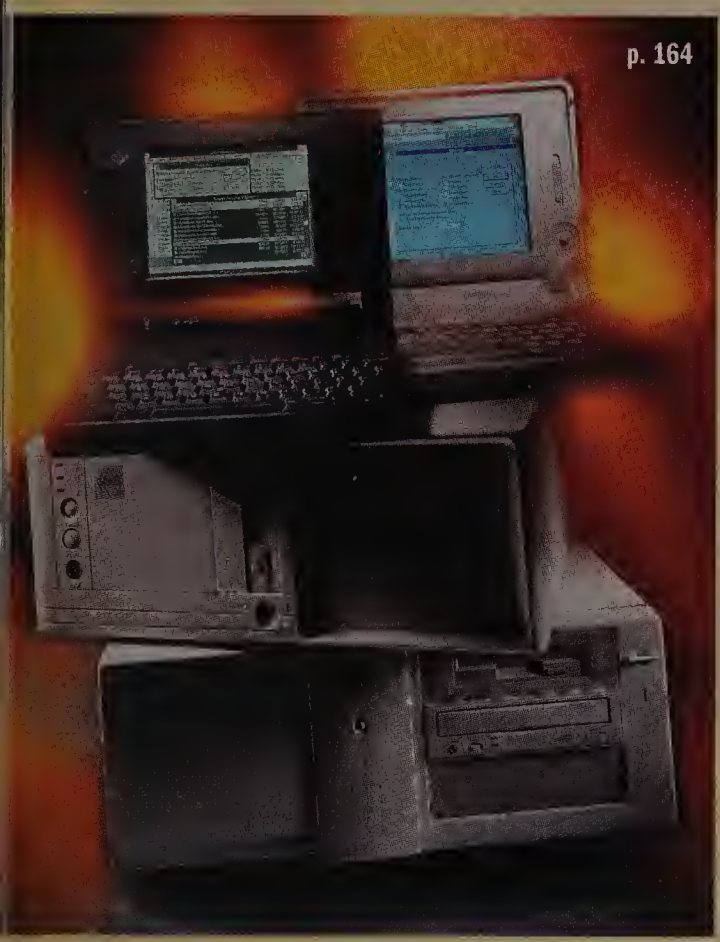
NUMBER 10



Color Printers

236 High Color, Low Cost
With street prices falling below $400, low-cost color printers are hot-ticket items. But the hidden costs of *using* a color printer—with costly consumables and poky performance—could make you see red. We'll help you choose a printer that'll be worth what you get out of it.

Reliability and Service Monitor

246 Win a Pentium-90 PC
How satisfied are you with your PC? Fill out and fax in this month's survey for a chance to win a Dell XPS P90 Pentium, a Best Buy PC from this month's Top 20 charts. Plus, fill out our PC World Reader Survey on page 245 for a chance to win an HP LaserJet 4P printer.

Databases

208 Windows Databases for Mortals
Will the new generation of databases bridge the chasm between power and ease of use? In search of databases for the rest of us, our Usability Lab asked users to evaluate the latest versions of File-Maker Pro, Q&A, Approach, Access, and Paradox. Here are our Best Buys.

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There's Only One Winning Shot– The ZEOS® Pantera.™

April 12, 1994
Pentium-66

June 28, 1994
DX4-100

April 1994
Pentium-60

August 1994
Pentium-90

January 1994
486DX2-66

February 1994
486DX2-66

March 1994
486DX2-66

June 1994
486DX2-66

June 1994
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July 1994
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Pentium-66

September 1994
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May 1994
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June 1994
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August 1994
Pentium-90

March 1994
486DX2-66

We're Racking 'Em Up

ZEOS is on an award-winning streak...with no end in sight. Unmatched in its success, our Pantera continues to rack up top industry awards–month after month.

Experts agree that the Pantera–based on Intel's Pentium, DX4 and 486 processors–is your sure shot.

Computer Shopper said: "ZEOS' Pantera was the obvious choice among the group...our best bet."

"ZEOS Pantera rose above the crowd and posted the most impressive performance numbers," reported *Windows Sources.*

PC/Computing concurred: "Rocket-fast performance and a great price make this our favorite Pentium of the lot."

Continuing with the ZEOS tradition of providing you with top performance, unwavering reliability and exceptional value, the ZEOS Pantera is unrivaled in its field.

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The Pantera's supreme power and game-winning performance begins with a ZEOS designed motherboard, one that is created specifically to take full advantage of the latest technological advancements. The motherboard is stocked with exceptional features such as an on-board PCI Local Bus IDE Controller supporting up to four IDE devices. For the fastest video performance, every Pantera comes with a new 64-bit PCI video card *standard.*

The results are unparalleled. The Pentium-66 and Pentium-90 Pantera PCs were "the fastest system(s) ever tested" by *PC World.* "Mark a new high on the performance chart! They don't come any faster."

The ZEOS Pantera 66MHz and 90MHz also received the highest scores in all benchmark tests run by *Windows Sources.*

Every Angle Covered

From every angle, you'll come up a winner with the completely compatible Pantera. In addition to your choice of processors, you can choose from one of our money-saving packages (many ready to ship the same day you order) or you can custom-design a system to your exact computing needs.

The best news: you don't need a lot of green to be a winner. As *PC/Computing* said: "We suggest you spend your money on this machine –it offers the best value of any system we tested." What's more, you can buy with confidence because of our ongoing commitment to provide you with high-quality features and state-of-the-art technology at an affordable price.

Unequalled in performance, reliability, and value, the ZEOS Pantera "is the ultimate Power Desktop." As *PC World* said: "It's lightning fast, beautifully configured, and priced right. That's what power Best Buy is all about." To get a sure shot, call a ZEOS Systems Consultant now at 800-554-5220.

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486DX-33	$1645 Lease $60/mo.	$1945 Lease $71/mo.	$2445 Lease $87/mo.	$2995 Lease $110/mo.
486DX2-50	$1645 Lease $60/mo.	$1945 Lease $71/mo.	$2445 Lease $87/mo.	$2995 Lease $110/mo.
486DX2-66	$1695 Lease $62/mo.	$1995 Lease $73/mo.	$2495 Lease $91/mo.	$3045 Lease $101/mo.
Pentium-60	$1995 Lease $73/mo.	$2295 Lease $84/mo.	$2795 Lease $102/mo.	$3345 Lease $111/mo.
Pentium-66	$2095 Lease $77/mo.	$2395 Lease $88/mo.	$2895 Lease $106/mo.	$3445 Lease $115/mo.
Pentium-90	$2295 Lease $84/mo.	$2595 Lease $95/mo.	$3095 Lease $103/mo.	$3645 Lease $121/mo.
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The New ZEOS Meridian™.

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Finally, desktop power to go. Travel around the world or to the highest peak. Work at home, in the office or on a plane. With the ZEOS Meridian line of color notebooks, the choices are endless and the power is unearthly.

What makes the Meridian the perfect workmate? Durable, sturdy construction that will travel anywhere, incredible power and performance that will take you to new heights, and more options than a road map. To meet your needs exactly, we offer you power, speed and memory choices—genuine Intel 486SX-33, 486DX2-50 or DX4-100 microprocessor; 4 or 8MB RAM user upgradable to 20MB; and IDE hard drives from 175MB to 350MB.

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If you like to travel light, the Meridian 400C, at just under four pounds, is your ideal traveling companion and ultimate subnotebook.

The 400C features a 7.8" diagonal, STN color, backlit screen (backlit monochrome display is also available); two Type II PCMCIA slots; and an ergonomic palm rest. Packages 2 and 3 also include an external ultra-light (9 oz.) 3.5" 1.44MB floppy drive.

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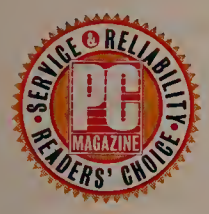
The 800C also includes a dual-scan color, backlit screen for

easy viewing; two Type II or one Type III PCMCIA slots; an internal 3.5" 1.44MB floppy drive; and an ergonomic palm rest.

Buy With Confidence



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- Supports an external SVGA color monitor at resolutions up to 1024 x 768.
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- Eraser-shaped integrated TruePoint™ pointing device.
- Replaceable, rechargeable NiMH battery.
- Serial port, enhanced parallel port, external VGA video port, external keyboard or PS/2 mouse port (800C includes both). 400C also with external floppy drive port.
- Full power management features include Low Power mode and programmable Standby features.
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- 400C: 7.8" x 10.2" x 1.7"; 3.9 lbs. 800C: 8.9" x 11.7" x 1.9"; 6.3 lbs.
- EPA Energy Star compliant.
- FCC Certified Class B; UL Listed.
- ZEOS Customer Satisfaction package.

Processors	Package 1		Package 2		Package 3	
	400C	800C	400C	800C	400C	800C
486SX-33	$1995 Lease $73/mo.	$2295 Lease $84/mo.	$2295 Lease $84/mo.	$2495 Lease $91/mo.	$2595 Lease $95/mo.	$2795 Lease $102/mo.
486DX2-50	$2195 Lease $80/mo.	$2495 Lease $91/mo.	$2495 Lease $91/mo.	$2695 Lease $99/mo.	$2795 Lease $102/mo.	$2995 Lease $110/mo.
DX4-100	$2495 Lease $91/mo.	$2795 Lease $102/mo.	$2795 Lease $102/mo.	$2995 Lease $110/mo.	$3095 Lease $103/mo.	$3295 Lease $110/mo.
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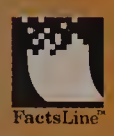

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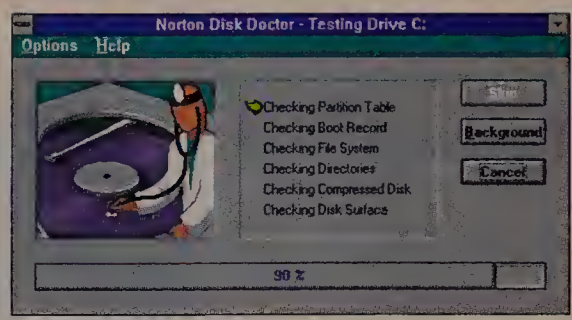

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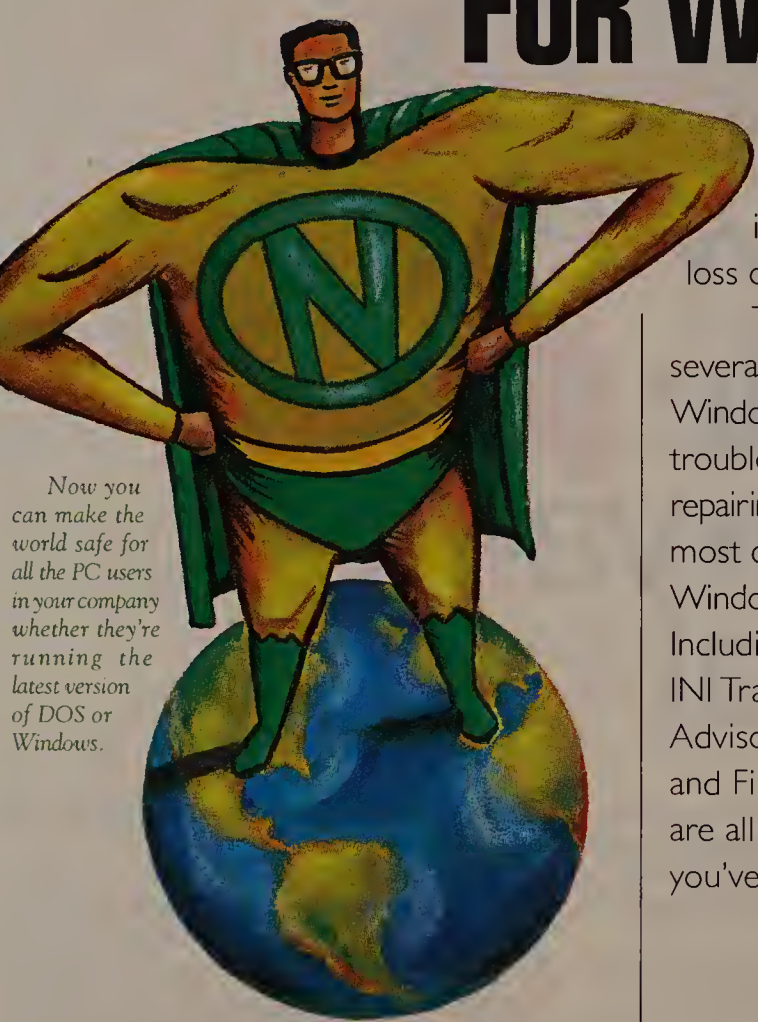

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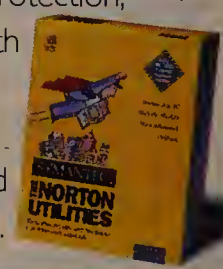

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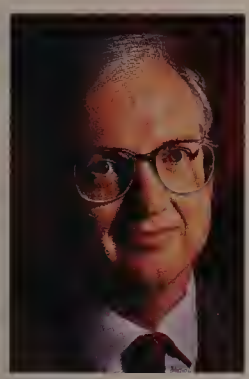
IBM and Apple Fumble Windows Challenge



With Windows 4.0 nearing its release date, three imminent events make this an important time to judge Microsoft challengers. IBM will soon ship its PowerPC models with desktop operating systems, and it plans to release a new version of OS/2 this fall. Apple is about to announce the first licensees for the Macintosh Operating System. Will these industry giants succeed in delivering greater choice in the look and feel of your desktop?

Because Apple and IBM are involved jointly in the development of the PowerPC chip, and because the Mac OS will be licensed only for PowerPC-based machines, let's begin by examining that area. As of this writing, Apple has sold 350,000 Power Macintosh units. IBM's PowerPC sales to date have all been for UNIX systems. PowerPC versions of Windows NT and Sun Microsystems' Solaris are coming, too, but IBM has always put its emphasis on developing OS/2 for the PowerPC.

That's already five different operating systems dividing the installed base of PowerPC hardware.

The Great Divide

There are other divisions as well: Apple's Power Macs and IBM's PowerPC systems suffer from hardware incompatibilities; IBM's "human centered" interfaces for the Workplace OS will force changes in OS/2 apps; and the installed base of Power Macintosh users is divided into three groups with varying software needs: publishing industry professionals, academics, and individual home or small-business users.

The net effect of all this is that the software market for the PowerPC—wonderful family of processors though it is— is increasingly fragmented. This inspires hesitation rather than development, which means fewer applications to make buying a PowerPC worthwhile.

The best hope for the PowerPC as a market force is that one of these segments will engulf the rest. Apple's 350,000 installed units makes the Power Macintosh the clear leader. Unfortunately for Apple, many software developers lost interest in the Mac when its market share dropped to 10 percent. And the Power Mac has yet to penetrate mainstream business—a failure Apple attributes to the delay in availability of Microsoft Word and Excel for the Power Mac.

Some at Apple believe that the dearth of OS/2 applications will force IBM to adopt the Mac OS on IBM's PowerPC systems. Conversely, there are people at IBM who think their company doesn't need Apple, since putting the same operating system microkernel in IBM PowerPC units, workstations, minicomputers, and mainframes will generate hundreds of new applications for OS/2. Both groups are dreaming. Apple's dreams will shatter because IBM can't simply convert to the Mac OS when it's still unavailable for IBM's Intel-based PCs. IBM's dreams will also be dashed, because future microkernel-based workstations, minis, and mainframes offer little enticement to developers, who favor the volume economics of the PC over anything that these types of hardware can offer.

Missed the Point

Apple and IBM announced their joint effort on July 3, 1991, promising a cross-platform operating system that would run DOS, Windows, OS/2, and Mac applications. More than three years after this grand alliance, meant to give the industry an alternative to the Intel-Microsoft axis, Apple and IBM seem to have missed the point. Apple now promises preemptive multitasking and memory protection for apps in the 1996 Mac OS release. But OS/2 offers those features now. Similarly, IBM promises human-centered interfaces in future versions of OS/2, when the Macintosh already has an appealing user interface. An effective alliance would have harnessed each partner's strength, created a large and uniform installed base to attract developers, and beaten Microsoft to market. Taligent—IBM and Apple's joint venture that will offer a high-end environment for developing custom corporate applications—may be a serious potential rival to NextStep, but it will hardly be a best-seller at Egghead.

Windows 4.0 will soon arrive with a friendly user interface, preemptive multitasking, memory protection for each 32-bit application, and backward compatibility with thousands of 16-bit programs. The introduction of Windows 4.0 is also going to prompt a great rush of new 32-bit applications. By concentrating on the fundamentals, Microsoft may well have shut the window on IBM's and Apple's hopes of becoming major operating system providers. Over the long term, this is both bad for you and bad for the computer industry. Rather than rail at Microsoft, however, we should all be shaking our heads at the failure of these two industry leaders to present software developers with a reasonable alternative.

An effective alliance would've harnessed each partner's strength, created a large installed base, and beaten Microsoft to market.

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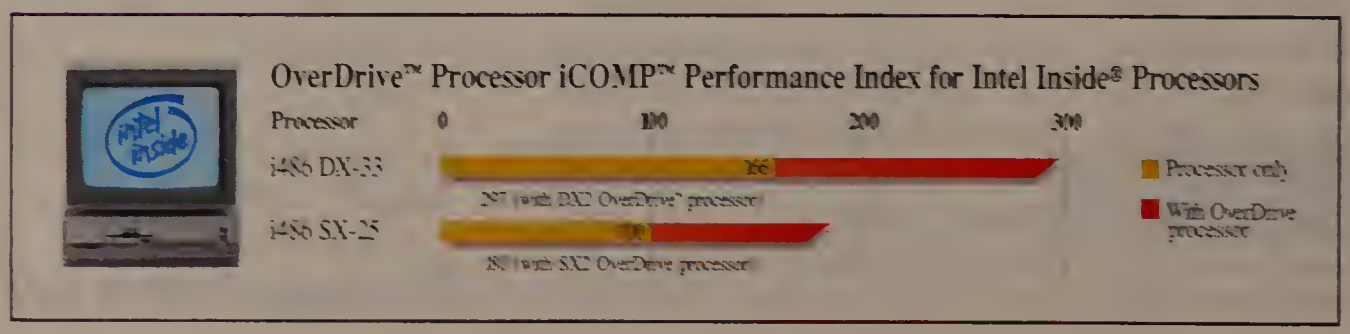

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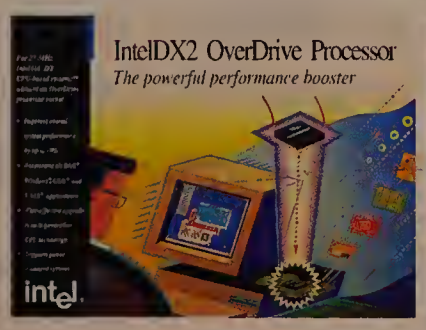

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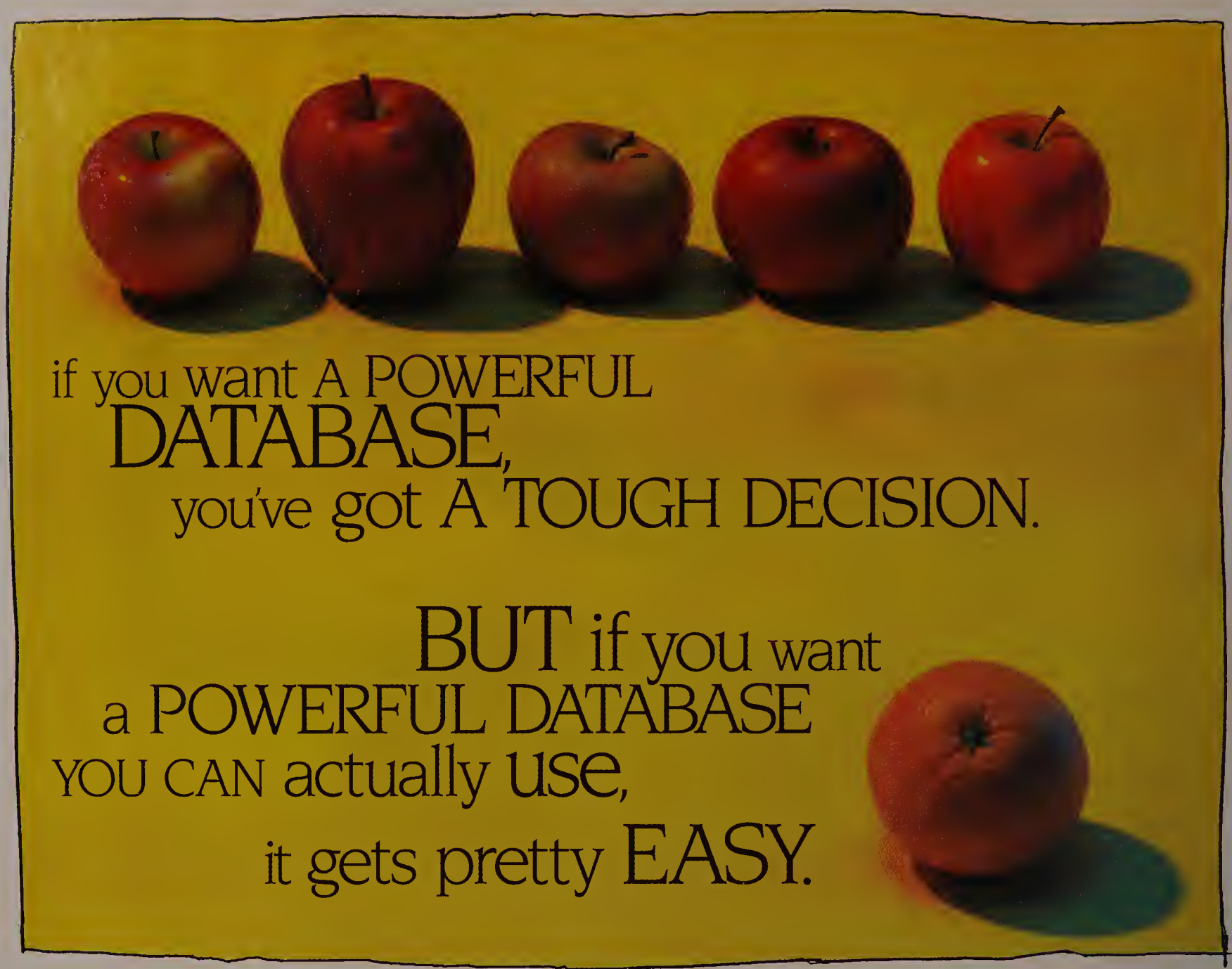

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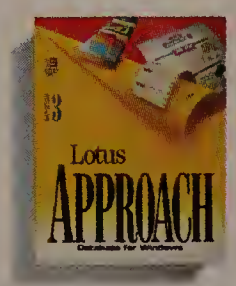

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managing contacts and analyzing and reporting data are surprisingly simple.

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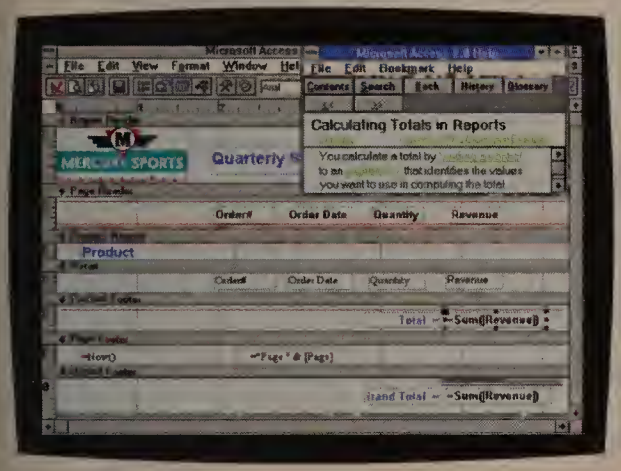
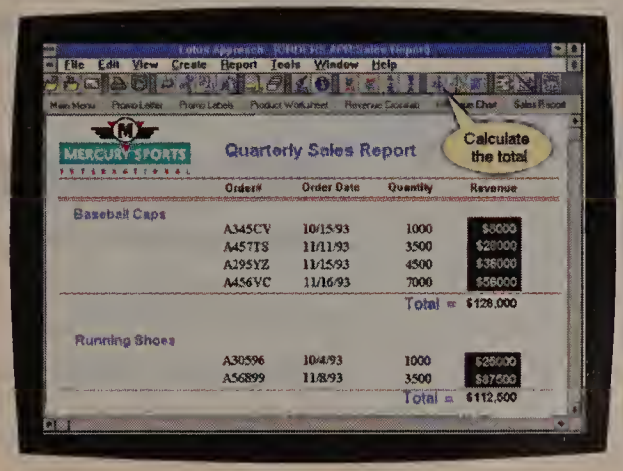


Constructing a report in Access. "Easy"?



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Circle 183 on reader service card

Question of Expertise, Tip Tussle, Affair of the Heart

The Real Experts

I must protest the new format for your World Class awards ["Best Products of 1994," July]. Crowning the best products of 1994 before 1994 was half over was a bit premature. And I couldn't care less what the so-called experts think. I would much rather find out what the real experts—*PC World* readers—think are the best products out there.

After all, readers are more likely to agree with one another than with jaded "experts" who have lots of money and unrealistic ideas of what the average person needs. The beauty of the old format was that people like me could vote for products that get the job done. It was the one forum in the industry where ordinary people had a say.
Richard B. Rogers, Fairfax, Virginia

Maximum K

I used to rely on MemMaker to optimize conventional memory, but after reading "Solving the Memory Shortage" [June], I was able to go from 583K to 609K! I let MemMaker do its best; then I put the device drivers and other TSRs in order of size and removed the /L location switches as you suggested. The result: an extra 26K.
Steve Bygrave, CompuServe

Helix Counterpoint

Your article "Solving the Memory Shortage" misstated or overlooked a number of issues. First, in reviewing memory managers, the author should have taken into account the amount of upper memory left free as well as the conventional memory. Most programs written since the advent of DOS 5.0 can use upper memory and conventional memory to provide more capabilities and better performance. In fact, some programs won't run at all unless there is enough upper memory available.

Second, Helix Software's Cloaking technology does not reduce system performance. Just the opposite is true. Cloaking actually increases performance through the use of 32-bit instructions and high-speed, privileged I/O access. Empirical tests, user feedback, and an analysis of the CPU timing issues involved all bear this out.

Finally, Netroom's ability to extend conventional memory to 736K in DOS *and* Windows was shortchanged in view of our competitor's inability to extend conventional memory outside Windows. Also, utilities included with Netroom—ScreenSaver, DiskCache, ScreenAccelerator, RAMDrive, and AntiVirus—that add significant value to the product were overlooked.
Michael L. Spilo, president, Helix Software Company

Editor's response: The amount of conventional memory a memory manager could free in a typical business system with nearly 200K of drivers loaded was our primary measure of these products' abilities, and Netroom did very well. Indicating the amount of free upper memory remaining would have been helpful to readers who have more than the typical set of drivers.

We apologize for the error regarding Cloaking's effect on performance. Unfortunately, Netroom did not automatically shadow the hard disk BIOS (as the others did); we mistakenly attributed the consequent marginal slowdown to Cloaking. —*Scott Spanbauer*

RAM Disk Bottleneck

Old hackers' tales die hard. I'm referring to tip 61 ["80 Windows Tips," July], "Temp Files + RAM Disk = Smart." This notion, which arose with the release of Windows 3.0, has been thoroughly repudiated. Why does it return periodically to haunt us?

Using a RAM disk for temporary files actually slows Windows down—*way* down—under most conditions.

First, a RAM disk isn't big enough to do the job. Print Manager fills a 2MB RAM disk after four to five pages when printing 360 by 360 dpi on a dot matrix. Given that you can't exit an app until all pages have spooled, you've not only tied up 2MB of RAM with the RAM disk, you're occupying the RAM of the app you could have exited from had you spooled to the hard drive. The active app is hogging system resources and using processor cycles, and other running apps that generate temporary files will lock up until the RAM disk space is free. This can cause data loss.

BEST PRODUCTS OF 1994

Your Ultimate Buying Guide: Experts Pick Hardware and Software Winners in 62 Categories • By Bronwyn Fryer

You're in the market for a new piece of software or hardware. You've read all the reviews and queried friends and co-workers, but you still can't find a consensus. Your stage-of-the-art computer says, sweet Product A is the best, while your MIS rep insists Product B is the sine qua non. What do you do?

It would be great if there were an expert you could turn to every time you have to choose an important piece of hardware or software. And now there is.

To help you make an expertly informed decision—whether you're picking the new database for your department or a CD ROM title for your family—*PC World* polled 200 PC experts who are proficient with a wide range of business and leisure products and asked them to select the World Class products for 1994. We picked our expert panel using two principal criteria: familiarity with a wide variety of hardware and software and with the PC industry as a whole, and an ability to make unbiased judgments. The group we polled is as diverse as the winning products they selected: technical support and computer training professionals, industry analysts, user group presidents, consultants, value-added resellers, corporate and government computer buyers, writers, and editors.

In the pages that follow, you'll find a complete list of the World Class award winners and hear why our experts selected them. The final list represents a mix of old favorites, such as Artsoft's LANtastic peer-to-peer networking software, and exciting newcomers, like Architecture's innovative personal information manager, Ecco Professional. Old or new, the winners share some important traits: innovative design, high performance, and solid value.

PCs
Printers
Monitors
Hard Disks
Graphics and Sound Boards
Applications
Online Services

Second, all Windows apps run in the same virtual machine. Insofar as not even one app can fit into this limited memory space, Windows pages sections of code between the first 640K of RAM and extended [XMS] memory. When it runs out of XMS, it pages to your hard drive's swap file(s). Using the hard drive as virtual memory is far slower than using XMS, and if you've stolen 2MB of RAM for a RAM disk, Windows will have to use virtual memory more often.
Maloney, Spokane, Washington

Editor's response: Maloney's right: For some users and tasks, a RAM disk

STAN MUSILEK

will consume enough memory to slow Windows down. That's why our tip said 2MB is the minimum, not the optimum, size for a RAM disk; in this case, bigger is better. We also said you shouldn't consider a RAM disk unless you have at least 8MB RAM; the more RAM you have, the more sense a RAM disk makes. Our point remains that for the average user with adequate memory, putting temp files on a RAM disk can improve performance. —*Dan Miller*

Decimals Gone Wrong

Your design skill, shown in the revamped FBI poster in July's *Publishing & Presentations*, doesn't extend to weapons classifications. There's no such thing as a ".12 gauge shotgun" or "44 magnum handgun." Shotgun terminology appears to confuse even the FBI, as revealed by their poster.

Shotgun gauges are determined by the number of equal-size spheres that can be made from a pound of lead and fired from a similar-size barrel. Twelve balls the size of a 12-gauge bore would equal a pound of lead. There is no decimal before the gauge number, as whole objects are being identified.

Caliber identifies the diameter of a bullet in hundredths of an inch. A .44 magnum bullet is 44/100 inch in diameter, or .44 inch. The decimal is required for this description.

I would not fear the person described in your poster as armed with a ".12 gauge shotgun," which would fire a single-bore–size pellet approximately two-thirds the size of a BB. Nor would I be concerned about someone carrying a "44 magnum handgun." A pistol that size would be most unwieldy: Imagine the weight of a bullet 44 inches in diameter—let alone the weight of the cannon it would take to chamber one.
James Finger, Jackson, Tennessee

Pulse Metric Checks In

Michael Goodwin says in June's *Break Time* that the accuracy of blood pressure measurement is "a complex issue." I agree. Those complexities merit a scientific examination of a clinical device rather than the haphazard approach of having a single individual take a dozen blood pressure measurements to determine the device's accuracy. I was dismayed that Mr. Goodwin would classify the DynaPulse as inaccurate based on his limited experience in testing it.

Pulse Metric has gone to great effort and expense to validate the accuracy of the DynaPulse system. In extensive clinical trials, we have come to the inescapable conclusion that not only is the DynaPulse accurate, but it is one of the most accurate devices on the market today.

One feature of DynaPulse is its ability to validate measurement accuracy visually by using the heartbeat pressure wave displayed after each measurement. The pressure wave in the screen shot on page 315 of the June *PC World* validates the measurement at 136 over 78, not 15 to 25 points lower as Mr. Goodwin would have us believe.

Pulse Metric welcomes any interested *PC World* readers to contact us at 800/927-8573 for a summary of clinical trials that have been performed using the DynaPulse.
Andy Lindgren, sales manager, Pulse Metric

Author's response: When I tested the DynaPulse and found a significant, consistent discrepancy between its readings and those I obtained on my sphygmomanometer, I

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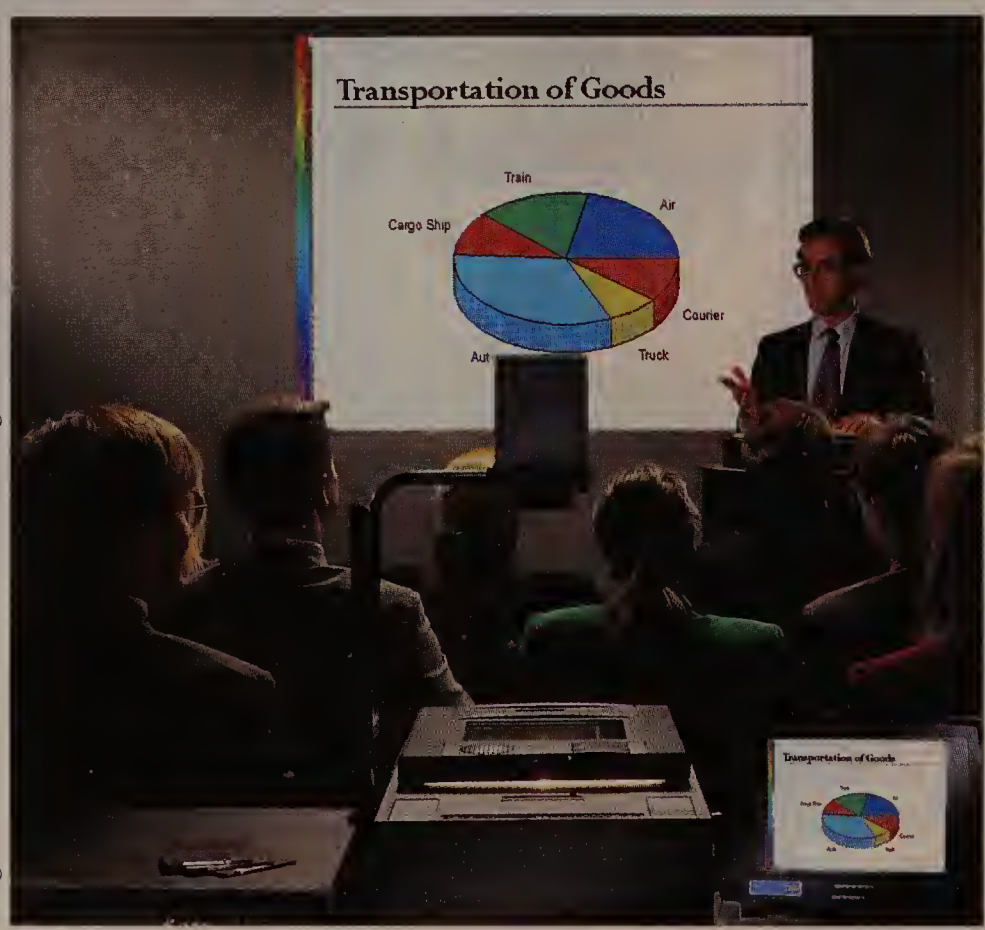

Image shown is an actual nVIEW LCD image.

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Circle 176 on reader service card

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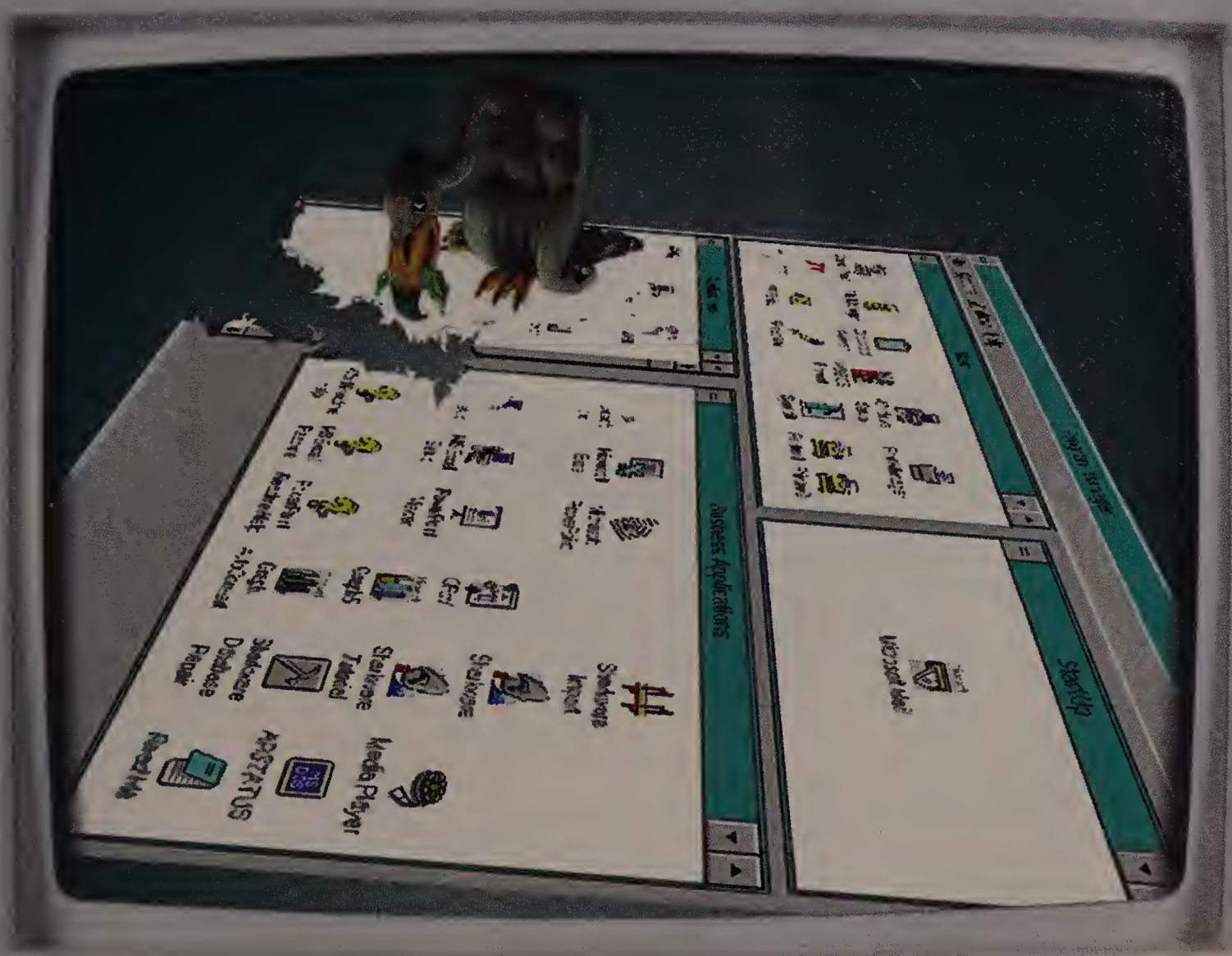

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Circle 161 on reader service card

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called Pulse Metric and spoke with CEO Shiu-Shin Chio. During our lengthy discussion, he insisted I must be getting an incorrect reading from the sphygmomanometer. He suggested it might be improperly calibrated or my hearing may have deteriorated so I couldn't hear pulse beats correctly.

I decided to consult someone with more expertise than I have, and less of a vested interest than Pulse Metric's CEO has: my doctor. He referred my questions to several doctors in cardiology at Kaiser Hospital in Fairfield, California. They felt that since traditional "normal" readings were based on sphygmomanometer readings, the generally higher measurements delivered by the DynaPulse could be problematic.

Even so, I was concerned that my sphygmomanometer might be inaccurate or I might be using it incorrectly. I took it to my doctor, and we each measured my blood pressure several times with our own instruments. Each time, our measurements were identical. —*Michael Goodwin*

Corrections and Clarifications

The sidebar "A Civilian Surfs the Internet" (August, page 220) gives the wrong address for obtaining Mosaic via the Internet. We should have said, "FTP to ftp.ncsa.uiuc.edu." Also, Trumpet WinSock is shareware, not public domain software.

August's *Communications Q&A* discussed KingCom, which has since been sold to E Ware—the new number is 800/892-9950.

July's "Top 10 Windows Accelerators" mentioned that the Western Digital Paradise VL Plus lacks true-color support. In fact, it displays true color at 640 by 480.

PC World regrets the errors.

Letters *welcomes your responses and ideas* *(see page 12 for contact information).*

AND THE WINNER IS...

PC World congratulates Bea Page, president of the South Mountain Users Group in Phoenix, Arizona, whose World Class ballot was selected randomly as the winning entry. Ms. Page's prize was her choice of $10,000 worth of World Class award–winning hardware and software.

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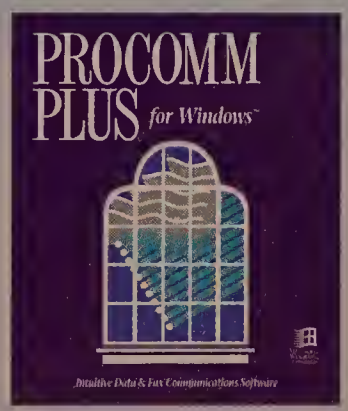

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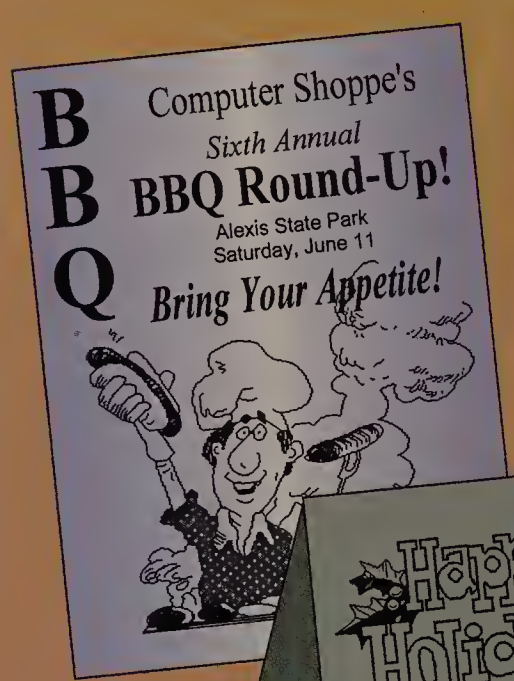

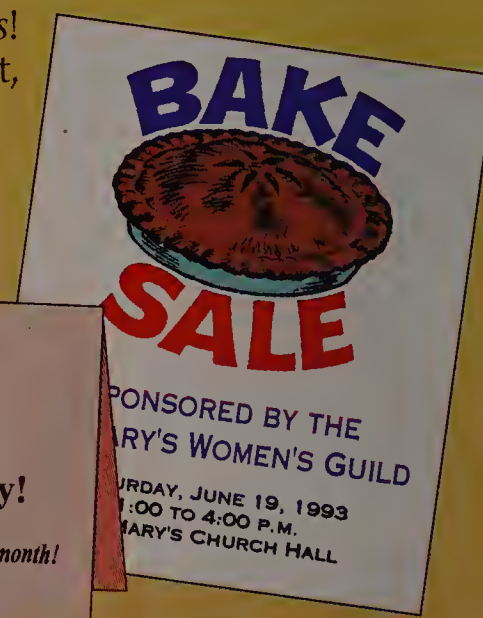

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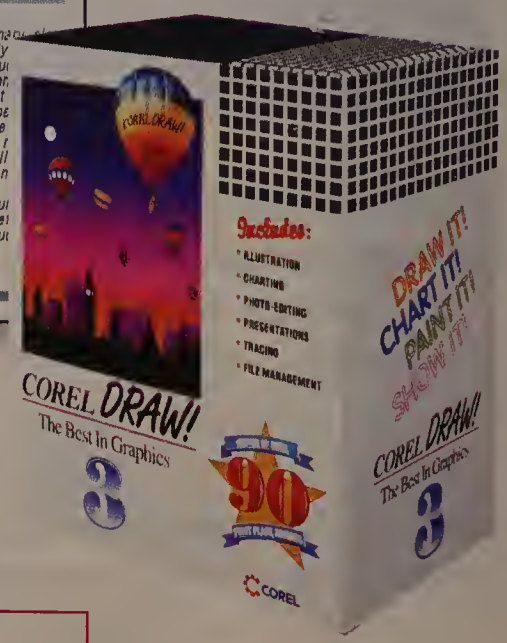

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Annual National Guide to PC User Groups

If you've ever found yourself cursing at the computer, banging the keyboard in frustration, or simply unable to accomplish something you're sure the machine can do, perhaps you should consider a support group.

All across the country, people feel just like you do. And they are getting together to help each other work through these problems. They share information, tips, and training. Many of them provide software libraries and bulletin board services (BBSs). To find a group close to you, check the following listing.

(Unfortunately, due to space limitations, we can include only general-interest groups located in the United States and Canada. We apologize to any groups we have left out. We can list only those groups whose information we are able to confirm. If your favorite group isn't listed, send us the details, and we'll include it next year.)

Groups are listed alphabetically by state and city. If you don't find a group near you, contact one of the following organizations:

America Online
8619 Westwood Center Dr. #200
Vienna, VA 22182
800/827-6364,
703/893-6288

Association of PC User Groups
914/876-6678
(user group locator service line)

ALASKA

Alaska Computer Society
P.O. Box 240945
Anchorage, AK 99524-0945
$25/yr.; NL; 8 SIGs; TS; TE; SL; BBS

Polar PC User Group
P.O. Box 72934
Fairbanks, AK 99707
907/452-2500
$10/yr.; NL; TE; SL

ARIZONA

Bisbee Users Group
P.O. Box 5012
Bisbee, AZ 85603-5012
602/432-5087
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

South Mountain Users Group
P.O. Box 50002
Phoenix, AZ 85076
602/759-3725 (7–9 p.m.)
$30/yr.; NL; 2 SIGs; TS; TE; SL

Tucson Computer Society
Box 1489
Tucson, AZ 85702
602/744-9654
$30/yr.; NL; 16 SIGs; TS; TE; SL; BBS

ARKANSAS

Northwest Arkansas PC User Group
2024 Ball Ave.
Fayetteville, AR 72703
501/442-5788
$15/yr.; NL; TS; SL

Central Arkansas PC Users Association
P.O. Box 24064
Little Rock, AR 72221-4064
501/225-9304
$24/yr.; NL; 6 SIGs; TS; SL; BBS

South Arkansas PC Users Group
2206 N. Jackson St.
Magnolia, AR 71753
501/234-2258
$15/yr.; NL; TS; TE; SL; BBS

CALIFORNIA

Pasadena IBM Users Group
2303 Glen Canyon Rd.
Altadena, CA 91001-3539
818/791-1300
$48/yr.; NL; 10 SIGs; TS; TE; SL; BBS

Berkeley PC/Compatibles User Group
1145 Walnut St.
Berkeley, CA 94707
510/526-4033
No fee; NL; 2 SIGs; TS; TE; SL; BBS

The Valley Computer Club
P.O. Box 6008
Burbank, CA 91510-6008
818/842-3707 (voice/fax)
$35/yr.; NL; 2 SIGs; TS; TE; SL; BBS

R&W IBM PC Users Group
2076 San Gabriel Ave.
Clovis, CA 93611
209/294-8831
No fee; NL; TS; TE; SL

Orange Coast IBM PC User Group
P.O. Box 6100-211
Costa Mesa, CA 92628
714/843-2048
$36/yr.; NL; 25 SIGs; TS; TE; SL; BBS

Color America, Inc.
1466 Spruce Tree Dr.
Diamond Bar, CA 91765
909/860-0090
$25/yr.; NL; 2 SIGs; TS; TE; SL

Technical User Group Network
3926 Community Ave.
La Crescenta, CA 91214
818/249-1629
$36/yr.; NL; 7 SIGs; TS; TE; SL

Antelope Valley Microcomputer User Group
P.O. Box 2942
Lancaster, CA 93539
805/948-5166
$25/yr.; NL; TS; TE; SL; BBS

Los Angeles Computer Society
P.O. Box 661189
Los Angeles, CA 90066-9589
310/471-2726
$36/yr.; NL; 12 SIGs; TS; TE; SL; BBS

San Luis Obispo PC Users Group
2100 Andre Ave.
Los Osos, CA 93402
805/528-0121
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

Modesto PC Users Group
P.O. Box 5122
Modesto, CA 95352-5122
209/529-9612
$24/yr.; NL; 7 SIGs; TS; TE; SL; BBS

Monterey Bay Users Group—PC
177 Webster St. #A354
Monterey, CA 93940
408/373-6245
$25/yr.; NL; 6 SIGs; TS; SL; BBS

Napa Valley PC Users Group
P.O. Box 2653
Napa, CA 94558-0265
707/258-2509
$20/yr.; NL; 1 SIG; TS; TE; SL; BBS

North Orange County Computer Club
P.O. Box 3616
Orange, CA 92665
714/998-8080
$25/yr.; NL; 28 SIGs; TS; TE; SL; BBS

Channel Islands PC Users' Group
P.O. Box 5025
Oxnard, CA 93031
805/983-4741 (9 a.m.–9 p.m.)
$30 first yr., $20/yr. thereafter; NL; 2 SIGs; TS; TE; SL; BBS

Redding IBM PC Users Group
P.O. Box 494778
Redding, CA 96049-4778
916/244-5961 (recording)
$20/yr.; 5 SIGs; TS; TE; SL

Ripon PC User Group
1146 7th St.
Ripon, CA 95366-2569
209/599-6486
$24/yr.; NL; 12 SIGs; TS; TE; SL

Riverside IBM Computer Club
7860 Live Oak Dr.
Riverside, CA 92509-5339
909/685-5407
$25/yr.; NL; TS; TE, SL; BBS

State Microcomputer Forum
800 Capitol Mall
MIC-47
Sacramento, CA 94280
916/654-8102
No fee; NL; 4 SIGs; TS; TE; SL

Peninsula Computer Club
222 Laurel St. #310
San Carlos, CA 94070-2363
415/593-9981
$25/yr.; NL; TS; TE; SL; BBS

San Diego Computer Society
P.O. Box 87770
San Diego, CA 92138-7770
619/549-3787
No fee; NL ($25/yr.); 1 SIG; TS; TE; SL; BBS

BayTalk Computer Users Group (for Blind and Disabled)
4529 18th St.
San Francisco, CA 94114
415/431-0245
$12/yr.; NL; TS; TE; SL; BBS

San Francisco PC Users Group
3145 Geary Blvd. #284
San Francisco, CA 94118-3300
415/931-3110
$40/yr.; NL; 18 SIGs; TS; TE; SL; BBS

Silicon Valley Computer Society
2464 El Camino Real #190
Santa Clara, CA 95051-3097
408/956-0864
$38/yr.; NL; 22 SIGs; TS; TE; SL; BBS

PC Users' Group of the Redwoods
P.O. Box 5055
Santa Rosa, CA 95402
707/527-8737
$30/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Greater South Bay PC Users Group
P.O. Box 6950
Torrance, CA 90504-6950
310/335-2799
$25/yr.; NL; 9 SIGs; TS; TE; SL; BBS

North Bay Users Group
315 Nevada St.
Vallejo, CA 94590
707/644-9327
$20 first yr., $17/yr. thereafter; NL; 4 SIGs; TS; TE; SL; BBS

Tule Fog PC Users Group, Inc.
P.O. Box 1373
Visalia, CA 93279
$29 first yr., $24/yr. thereafter; NL; 4 SIGs; TS; TE; SL; BBS

ABBREVIATIONS KEY

NL: newsletter
SIG: special interest group
TS: technical support
TE: training and education
SL: software library
BBS: bulletin board service

COLORADO

Mile High Computer Resource Organization
8175 Sheridan Blvd. #210
Arvada, CO 80003
$25 first yr., $20/yr. thereafter; NL; 5 SIGs; TS; TE; SL; BBS

PC Users Group of Colorado
P.O. Box 944
Boulder, CO 80306
303/278-3835 (voice/fax)
$25/yr.; NL; BBS

Electric Locksmith PC Users Group
P.O. Box 15217
Colorado Springs, CO 80935
719/390-0718 (voice/fax)
$24/yr.; NL; TS; TE; SL; BBS

Front Range PC Users Group
305 W. Magnolia #152
Fort Collins, CO 80521
303/223-8654
$25/yr.; NL; 6 SIGs; TS; TE; SL; BBS

Computer Users' Group of Greeley
3950 W. 12th St. #30
Greeley, CO 80634-2547
303/356-4171
$20/yr.; NL; 3 SIGs; TS; TE

The Alpha Micro Users Society (AMUS)
619 Florida Ave.
Longmont, CO 80501
303/678-7066
$75/yr.; NL; TS; TE; SL; BBS

Chaffee County Computer Club
P.O. Box 7
Poncha Springs, CO 81242
$18/yr.; NL; TS; TE; SL

CONNECTICUT

Central CT PC (PCjr) Group
781 Main St.
Coventry, CT 06238
203/742-6083
$6/yr.; NL; 1 SIG; TS; TE; SL

Business & Professional Micro Users Group, Inc.
P.O. Box 271468
West Hartford, CT 06127-1468
203/242-6587
$15/yr.; 10 SIGs; TS; TE; SL

FLORIDA

Boca Raton Computer Society, Inc.
P.O. Box 273421
Boca Raton, FL 33427-3421
$25/yr.; NL; 11 SIGs; TS; TE; SL; BBS

Microcomputer User's Group
1801 Vancouver Dr.
Clearwater, FL 34616
813/584-7128
$15/yr.; NL; TS; TE; SL

Tampa Bay Computer Society
1510 Barry St. Unit J-2
Clearwater, FL 34616-4444
813/443-4433 (recording)
$25/yr.; NL; 20 SIGs; TS; TE; SL; BBS

Space Coast PC Users Group
Cocoa, FL 32923-0369
407/254-1926
$25/yr.; NL; 11 SIGs; TS; TE; SL; BBS

Crystal River Users Group
P.O. Box 2108
Crystal River, FL 34423
$24/yr.; NL; 6 SIGs; TS; TE; SL; BBS

SW Florida PC Users Group
c/o Ed Kant
P.O. Box 1466
Fort Myers, FL 33902
813/598-3123
$25/yr.; NL; 2 SIGs; TS; TE; SL

So. Polk Co. PC Users Group
815 N. Lake Reedy Blvd.
Frostproof, FL 33843
813/635-3381
No fee; TE (for businesses)

The HogTown Hackers
4623 N.W. 13th Ave.
Gainesville, FL 32605
904/395-8012 (days)
$15/yr.; 3 SIGs; TS; TE; SL; BBS

Miami PC User Group
4651 Sheridan St. #300
Hollywood, FL 33021
305/962-8889
$24/yr.; NL; 8 SIGs; TS; TE; SL; BBS

Ridge Area Computer Users Group
251 Tower Lakes
Lake Wales, FL 33853-6802
813/676-5936
$20/yr.; NL; 6 SIGs; TS; TE; SL

Central Florida Computer Society
P.O. Box 948019
Maitland, FL 32794-8019
407/332-2883
$25/yr.; NL; 12 SIGs; TS; TE; SL; BBS

Physically Challenged Users' Group (National)
P.O. Box 16-1443
Miami, FL 33116-1443
$25/yr.; NL; 3 SIGs; TS; TE; SL

Charlotte Co. PC Users Group
P.O. Box 3530
Port Charlotte, FL 33949-3530
813/627-5231
$25/yr.; NL; 11 SIGs; TS; TE; SL; BBS

Tri-County Computer User Group, Inc.
P.O. Box 7414
Port St. Lucie, FL 34985-7414
407/335-1458
$25/yr.; NL; 30 SIGs; TS; TE; SL; BBS

EpSuncoast Users' Group
1237 79th St. S.
St. Petersburg, FL 33707
813/343-2668 (days)
$15/yr.; NL; TS; TE; SL

Sun City Center PC User's Group
1009 N. Pebble Beach Blvd.
Sun City Center, FL 33573
813/634-3664
$15/yr.; NL; 2 SIGs; TS; TE; SL

USF PC Users Group
SVC 4010
Tampa, FL 33620-6940
813/689-8662
No fee; NL; 6 SIGs; TS; TE; SL; BBS

Palm Beach PC Users Group
319 Sequoia Dr.
West Palm Beach, FL 33409
407/689-8841 (7–9 p.m.)
$20/yr.; NL; 3 SIGs; SL; BBS

GEORGIA

Athens IBM User Group
P.O. Box 6652
Athens, GA 30604
706/542-1766
$25/yr.; NL; TS; TE; SL; BBS

CSRA Computer Society, Inc.
P.O. Box 284
Augusta, GA 30903
706/650-6803
$20/yr.; NL; 5 SIGs; TS; TE; SL

Perry MS-DOS User Group
98 Knightsvue Pl.
Warner Robins, GA 31093
$18/yr.; NL; TS; TE; SL

Warner Robins User's Group, Inc.
218 Madrid St.
Warner Robins, GA 31093
912/328-3228
$36/yr.; NL; 3 SIGs; TS; TE; SL; BBS

HAWAII

TROA Users Group
94–1071 Leomana Pl.
Waipahu, HI 96797
808/671-8268 (voice/fax)
$10/yr.; NL; 3 SIGs; TS; TE; SL

ILLINOIS

Fox Valley Computer User Group
635 N. Westlawn
Aurora, IL 60506
708/897-4877
$25/yr.; NL; 3 SIGs; TS; TE; SL; BBS

Common User Group—PC Project
401 N. Michigan Ave.
Chicago, IL 60611-4267
312/644-6610
$60/yr.; NL; 27 SIGs; TS; TE; SL; BBS

Chicago Computer Society
P.O. Box 27
Deerfield, IL 60015-0027
312/794-7737
$40/yr.; NL; 18 SIGs; TS; TE; SL; BBS

Northern Illinois Computer Owners League
7611 W. Bloomingdale Ave.
Elmwood Park, IL 60635-4117
708/453-2514
$10/yr.; NL; TS; TE; SL; BBS

Starved Rock Computer Users Group
2335 N. Gulley Rd.
Morris, IL 60450
815/941-0975
$15/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Peoria Computer Club
P.O. Box 758
Peoria, IL 61652
309/266-4526
$20/yr.; NL; 1 SIG; TS; SL

Binary Chautauqua Society
307 W. Jackson St.
Petersburg, IL 62675
217/632-7284
$12/yr.; NL; TS; TE; SL

Fox Valley PC Association
P.O. Box 294
Plainfield, IL 60544
$24/yr.; NL; TS; TE; SL

Sandwich Computer Users Group
P.O. Box 23
Sandwich, IL 60548-0023
815/786-9223
$20/yr. family; NL; 4 SIGs; TS; TE; SL; BBS

Fox Valley Computer Society
P.O. Box 188
South Elgin, IL 60177
708/695-3195
$24/yr.; NL; 3 SIGs; TS; TE; SL; BBS

Illinois Academy of Engineers, Anglers, & Computer Buffs
3105 Newmark Civil Engineering Bldg., MC-250
205 N. Mathews Ave.
Urbana, IL 61801
217/333-3394
No fee; TS; TE

INDIANA

Anderson Council of Computer Users
830 Harold St.
Anderson, IN 46013-1628
317/646-3316 (days)
No fee; 1 SIG; TS; TE; SL; BBS

Elkhart PC Users Group
P.O. Box 13
Elkhart, IN 46515-0013
219/262-7312
No fee; NL; 2 SIGs; TS; TE; SL

Michiana Amateur Computer Society
P.O. Box 2171
Michigan City, IN
219/785-4295
$15/yr.; NL; TS; TE; SL; BBS

IOWA

Central Iowa Computer User Group
P.O. Box 672
Ankeny, IA 50021-0672
515/964-8861
$25/yr.; NL; 4 SIGs; TS; TE; SL; BBS

Quad-Cities Computer Society
P.O. Box 2456
Davenport, IA 52809-2456
319/386-3484
$20/yr.; NL; 19 SIGs; TS; TE; SL; BBS

Hawkeye PC Users' Group
P.O. Box 2592
Iowa City, IA 52244
319/335-1070
$15/yr.; NL; TS; TE; SL; BBS

KANSAS

Topeka PC Users Club
P.O. Box 1279
Topeka, KS 66601
913/273-0425
$15/yr.; NL; TS; TE; SL

Wichita PC Users Group
P.O. Box 781200
Wichita, KS 67278-1200
$25/yr.; NL; 3 SIGs; TS; TE; SL; BBS

KENTUCKY

Central Kentucky Computer Society, Inc.
1300 New Circle Rd. #105
Lexington, KY 40505
606/255-2527
$20/yr.; NL; 14 SIGs; TS; TE; SL; BBS

Kentucky-Indiana PC Users Group
P.O. Box 3564
Louisville, KY 40201
502/458-8972 (recording)
$35/yr.; NL; 15 SIGs; TS; TE; SL; BBS

LOUISIANA

PAGE Computer User's Group, Inc.
P.O. Box 7703
Alexandria, LA 71306-7703
318/443-1395
$24/yr.; NL; 3 SIGs; TS; TE; SL; BBS

Cajun Clickers Computer Club
P.O. Box 1947

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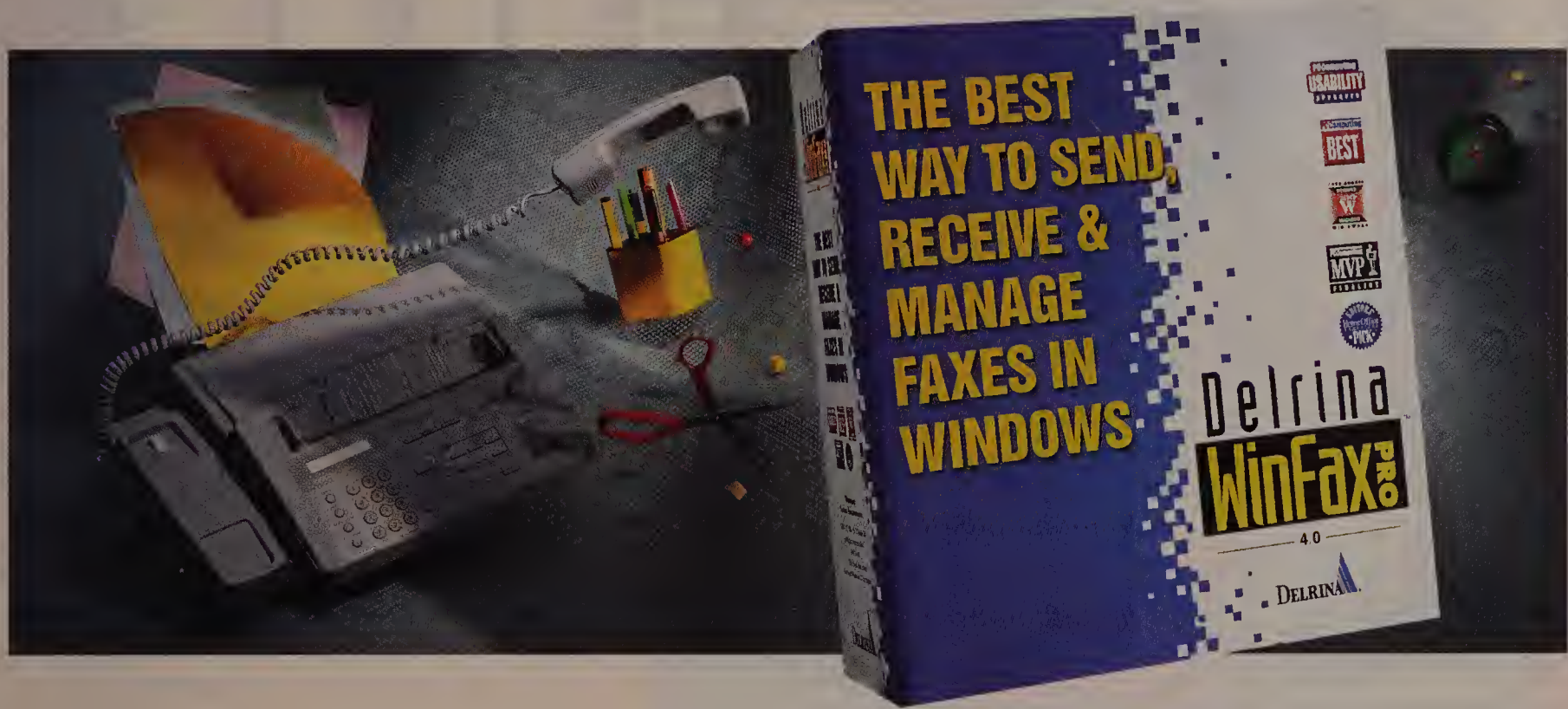

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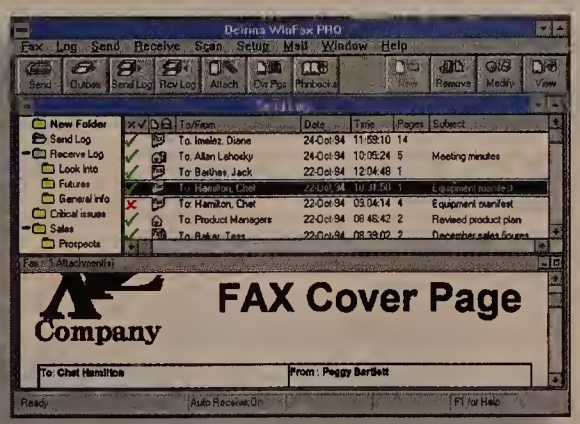

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NEW VERSION 5.0

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Comparison Facts

End-user Features	Paradox 5.0	Access 2.0
Built-in computer-based training	✓	
Integrated graphics	✓	
Built-in workgroup and mail capabilities	✓	
Quick Filter without Query Process	✓	
Power-user/Developer Features		
OLE 2.0 client and server support	✓	
Compatibility with applications from previous version	✓	
Transparent connectivity and scalability with database aliases	✓	
Record level locking	✓	
Graphical Integrated Development Environment (IDE)	✓	
ODBC-compliant	✓	✓
Dedicated high-performance native SQL drivers	✓	

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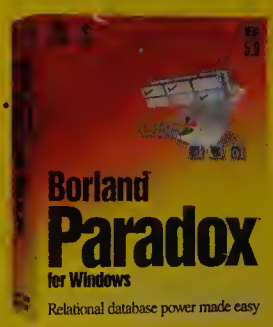

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Chalmette Computer Users' Group
P.O. Box 1515
Chalmette, LA 70044
504/279-8606
$20/yr.; NL; 4 SIGs; TS; TE; SL

New Orleans Personal Computer Club
701 Metairie Rd. #2A-210
Metairie, LA 70005-4049
504/838-9999, ext. 11
$30/yr.; NL; 16 SIGs; TS; TE; SL; BBS

NW Louisiana PC User Group
945 Dudley Dr.
Shreveport, LA 71104-4815
318/868-5950
No fee; NL; 4 SIGs; TS; SL; BBS

MAINE

Maine State Employees PC Users Group
Dept. of Education, Station 23
Augusta, ME 04333
No fee; TS; TE; SL

Maine DOS Users Group
P.O. Box 8578
Portland, ME 04101-8578
207/839-8869
$25/yr.; NL; TS; TE; SL

MARYLAND

Computer Users of Baltimore
P.O. Box 23510
Baltimore, MD 21203
410/296-0501
$20/yr.; NL; 2 SIGs; TS; TE; SL

Central Maryland Microcomputer User's Group
9337 Angelina Cir.
Columbia, MD 21045-5110
410/381-4762
$25/yr.; NL; 2 SIGs; TS; SL; BBS

Hagerstown Users Group
1136 Sunnyside Dr.
Hagerstown, MD 21742-3044
301/790-2638
$15/yr.; NL; 3 SIGs; TS; TE; SL; BBS

Capital PC User Group, Inc.
51 Monroe St., Plaza East Two
Rockville, MD 20850
301/762-6775 (recording)
$35/yr.; NL; 35 SIGs; TE; SL; BBS

MASSACHUSETTS

Boston Computer Society IBM-PC Users' Group
188 Needham St. #230
Newton, MA 02164
617/466-8435 (recording)
$39/yr.; NL; 25 SIGs; TS; TE; SL; BBS

Boston Computer Society
101-A 1st Ave. #2
Waltham, MA 02154
617/290-5700
$39/yr.; NL; TS; TE; SL; BBS

Pioneer Valley Computer Club
P.O. Box 87
Westfield, MA 01086
413/568-1366
$25/yr.; NL; 3 SIGs; TS; TE; BBS

New England Computer Society
P.O. Box 363
West Springfield, MA 01089
413/789-0540 (after 6 p.m.)
$15/yr.; NL; 3 SIGs; TE; SL; BBS

MICHIGAN

South Eastern Michigan Computer Organization (SEMCO)
P.O. Box 707
Bloomfield Hills, MI 48303
810/398-7560
$20/yr.; NL; 12 SIGs; TS; TE; SL; BBS

The Users' Personal Computer Organization
P.O. Box 45
East Lansing, MI 48826-0045
517/337-0515
$20/yr.; NL; 4 SIGs; TS; TE; SL

Delta DOS Users Group
1415 Michigan Ave.
Gladstone, MI 49837
906/428-1014 (voice/fax),
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

MINNESOTA

Twin Cities PC User Group
Edina Community Center
5701 Normandale Rd.
Edina, MI 55424
612/929-5850
$30/yr. family; NL; 28 SIGs; TS; SL; BBS

MISSISSIPPI

Oxford Computer User Group
P.O. Box 1408
University, MS 38677
601/232-7206
$15/yr.; NL; TS; SL

MISSOURI

Kansas City IBM PC User Group
221 E. 63rd St.
Kansas City, MO 64113
816/444-8709
$15/yr.; NL; 5 SIGs; TS; TE; SL

St. Louis Users Group for the Personal Computer
P.O. Box 69099
St. Louis, MO 63169-0099
$35/yr.; NL; 15 SIGs; TS; TE; SL; BBS

NEVADA

Las Vegas PC Users Group
1350 E. Flamingo Rd. #188
Las Vegas, NV 89119
702/736-3788
$30/yr.; NL; 20 SIGs; TS; TE; SL; BBS

NEW HAMPSHIRE

Seacoast IBM User's Group
Dover Point Office Park, Ste. 44H
Dover, NH 03820
603/742-2233
$25/yr. family (BBS $10 extra); NL; TE; SL; BBS

NEW JERSEY

Philadelphia Hub PC Users Group
16 W. Judith Dr.
Blue Anchor, NJ 08037-9614
609/567-1283
No fee; NL; 3 SIGs; TS; TE; SL

PC User Group of South Jersey
P.O. Box 427
Cherry Hill, NJ 08003
609/678-7179 (voice/fax)
$25/yr.; NL; 8 SIGs; TS; TE; SL; BBS

Brookdale Computer Users Group
103 Heather Ct.
Middletown, NJ 07748
908/671-1785
$15/yr.; NL; TS; TE; SL; BBS

New Jersey PC Users' Group
P.O. Box 14
Paramus, NJ 07653-0014
201/447-7111
$30/yr.; NL; 2 SIGs; TE; SL; BBS

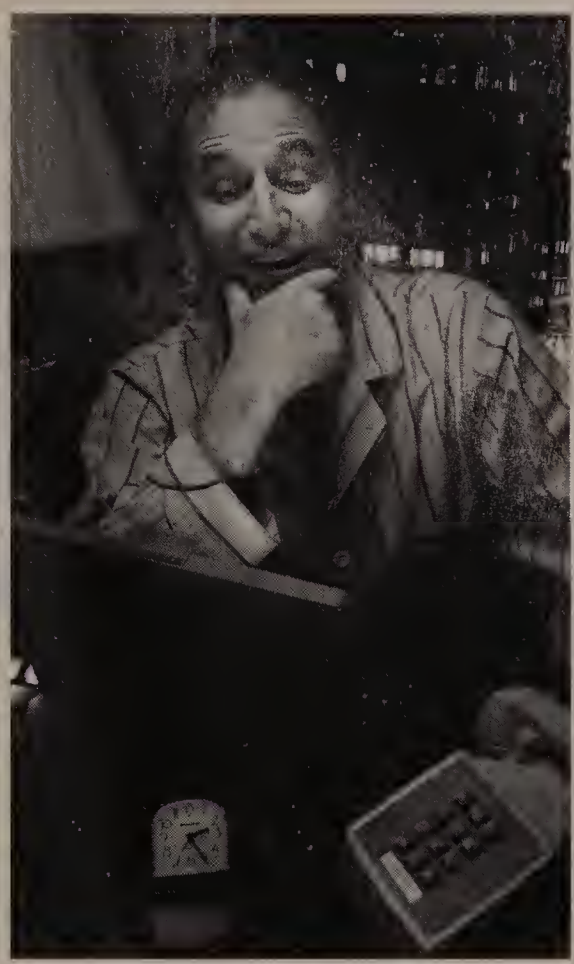
Garden State Computer Users Group, Inc.
89 Stratford Rd.
Tinton Falls, NJ 07724
908/542-2113 (7–10 p.m.)
$15/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Computer Connection
P.O. Box 382
Voorhees, NJ 08043
609/783-7444
No fee; TS; TE; SL; BBS

NEW YORK

Long Island PC Users' Group
659 Stratford Rd.
Baldwin, NY 11510-1031
516/223-1761
$24/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Queensborough IBM PC Users Group
53-32 213th St.
Bayside, NY 11364
$10/yr.; NL; TS; SL



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Long Island Computer Association
P.O. Box 71
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30 Fraser Ave.
Monticello, NY 12701
914/794-1053
$30/yr.; NL; 4 SIGs; TS; TE; SL; BBS

New York Amateur Computer Club
P.O. Box 3442 Church St. Sta.
New York, NY 10008
212/505-6021
$20/yr.; NL; SL; 12 SIGs; TS; TE; BBS

New York Personal Computer Users Group
40 Wall St. #2124
New York, NY 10005-1301
212/686-6972, 212/533-6972
$35/yr.; NL; 53 SIGs; TS; TE; SL; BBS

Micro Computer Club
Bldg. 052, Dept. B25X
IBM Poughkeepsie
Poughkeepsie, NY 12601
914/485-3159 (evenings),
$6/yr.; NL; 6 SIGs; TS; TE; BBS

Central New York PC Users Group, Inc.
P.O. Box 6411
Syracuse, NY 13217-6411
315/638-2378
$30/yr.; NL; 7 SIGs; TS; TE; SL; BBS

Westchester PC User's Group
P.O. Box 349
White Plains, NY 10602-0349
914/962-8022
$30/yr.; NL; 6 SIGs; TS; TE; SL; BBS

NORTH CAROLINA

IBM PC Users Group of Asheville North Carolina
34 Park Ave.
Asheville, NC 28803
704/274-2269 (voice/fax)
$15/yr.; NL; 3 SIGs; TS; TE; SL

Metrolina Netware Users Group
P.O. Box 35375
Charlotte, NC 28235-5375
704/336-7212 (days)
$25/yr.; NL; 1 SIG; TS; TE; SL; BBS

Hendersonville Area Computer Society
P.O. Box 208
Hendersonville, NC 28793
$15/yr.; NL; 3 SIGs; TS; TE; SL

OHIO

Akron Canton PC Users Group
P.O. Box 2151
Akron, OH 44309
216/928-7179
$25 first yr., $20/yr. thereafter; NL; 3 SIGs; TS; TE; SL

The NE Ohio PC Users Group
P.O. Box 81281
Cleveland, OH 44181-0281
216/433-4387
$25/yr.; NL; 9 SIGs; TS; TE; SL; BBS

Columbus Computer Society
P.O. Box 163336
Columbus, OH 43216-3336
614/447-0227
$25/yr.; NL; 22 SIGs; TS; TE; SL; BBS

OSU PC User Group
1971 Neil Ave.
Columbus, OH 43210
614/292-1558
No fee; NL; SL

Dayton Microcomputer Association Inc.
P.O. Box 4005
Dayton, OH 45401-4005
513/848-6362 (voice/fax)
$12/yr.; NL; 7 SIGs; TS; TE; SL; BBS

Newark Area Computer Club, Inc.
1373 Howell Dr. N
Newark, OH 43055-1737
614/344-2323
$24/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Toledo PC Users Group
P.O. Box 13085
Toledo, OH 43613-3085
419/255-7921
$25/yr.; NL; 2 SIGs; TS; TE; SL; BBS

OKLAHOMA

OKC-PC User's Group
P.O. Box 12027
Oklahoma City, OK 73157-2027
405/943-7066
$25/yr.; NL; 22 SIGs; TS; TE; SL; BBS

OREGON

The Computer Group
P.O. Box 22233
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503/688-5855
$15/yr.; NL; TS; TE; SL; BBS

Eugene PC Users Group
P.O. Box 11436
Eugene, OR 97440
$25/yr.; NL; 4 SIGs; TS; TE; SL; BBS

RACC Computer Club
1358 Willow Ct.
Grants Pass, OR 97527
503/479-8629
$15/yr.; NL; TS; TE; SL; BBS

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Association of Personal Computer Professionals
P.O. Box 2005
Bala Cynwyd, PA 19004
800/729-6541
$45/yr.; NL; 1 SIG; TE

Computer Users of Erie
P.O. Box 1975
Erie, PA 16507-0975
814/835-9115
$25/yr.; NL; 10 SIGs; TS; TE; SL; BBS

Harrisburg PC Users Group
1195 Fairmont Dr.
Harrisburg, PA 17112
717/652-9097
$15/yr.; NL; 2 SIGs; TS; TE; SL; BBS

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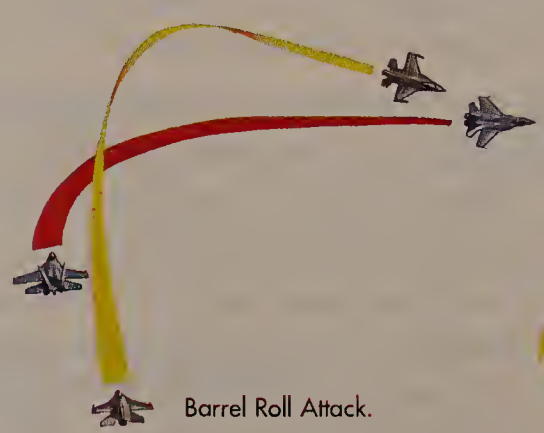
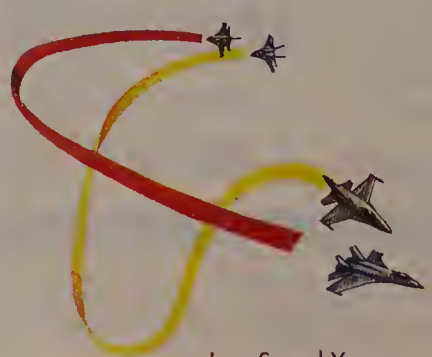

Barrel Roll Attack.

Offset Head-on Pass.

The Immelman.


Low Speed Yoyo.

Barrel Roll.

Rollaway.

National PC Users Group
P.O. Box 1076
Lemont, PA 16851
814/237-5511 (4–7 p.m.)
$26/yr.; NL; TS; TE; SL; BBS

DELCHUG (Delaware-Chester Users Group)
P.O. Box 299
Lionville, PA 19353
No fee; NL; 13 SIGs; TS; TE; SL; BBS

Windows User Group Network
126 E. State St.
Media, PA 19063
800/946-8737
$99/yr.; NL; TS; SL; BBS

CPA Computer User Group
P.O. Box 56
Narberth, PA 19072
215/664-6775
$40/yr.; NL; TE; SL

Philadelphia Area Computer Society
Box 312
Philadelphia, PA 19141
215/951-1255 (days)
$27 first yr., $25/yr. thereafter; NL; 60 SIGs; TS; TE; SL; BBS

Pittsburgh Area Computer Club
P.O. Box 6440
Pittsburgh, PA 15212
412/766-8790
$20/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Philadelphia Area Computer Society, IBM Group (PACS)
989 Beechwood Pl
Warmister, PA 18974-1162
215/674-2739

White Rose IBM Computer Enthusiasts
P.O. Box 54
York, PA 17405-0054
717/246-1440
$15/yr.; NL; SIGs; TS; TE; SL; BBS

RHODE ISLAND

Providence Chapter, Boston Computer Society
IBM PC User's Group
4 Teakwood Ln.
Barrington, RI 02806-3217
401/245-5097
$39/yr.; NL; 2 SIGs; TS; TE

South Co. Computer Users Group
P.O. Box 493
Wakefield, RI 02880
401/783-6469
$10 (one-time fee); TS; TE; SL; BBS

SOUTH CAROLINA

Upstate IBM-PC Users Group
P.O. Box 5521
Greenville, SC 29606

Hilton Head Island Computer Club
16 Forest Dr.
Hilton Head Island, SC 29928
803/671-2250
$18/yr.; NL; 10 SIGs; TS; TE; SL; BBS

Orangeburg Computer Club
P.O. Box 474
Orangeburg, SC 29116-0474
803/534-0344
$25/yr.; NL; 1 SIG; TS; SL; BBS

The Keowee Computer Club
10 Cutter Ln.
Salem, SC 29676-9208
803/944-1970
$15/yr.; NL; 2 SIGs; TS; TE; SL

Anderson PC Users Group
110 Blake Dr.
Townville, SC 29689
803/287-9080 (voice/fax)
$12/yr.; NL; 1 SIG; TS; SL; BBS

SOUTH DAKOTA

Sioux Falls IBM and PC Compatibles Users Group
P.O. Box 89701
Sioux Falls, SD 57105
605/361-1818
$10/yr.; NL; 1 SIG; TS; TE; SL

TENNESSEE

Cumberland Microcomputer Users Group
P.O. Box 151
Cookeville, TN 38503
615/526-4869
$20/yr.; NL; 3 SIGs; TS; TE; SL

East Tennessee PC Users Group
448 N. Cedar Bluff Rd. #184
Knoxville, TN 37923
615/690-8009 (evenings)
$20/yr.; NL; 12 SIGs; TS; TE; SL

Memphis PC Users Group
P.O. Box 241756
Memphis, TN 38124-1756
901/278-8434
NL; 14 SIGs; TS; TE; SL; BBS

Murfreesboro Area Computer Hobbyists
P.O. Box 8114
Murfreesboro, TN 37133-8114
615/895-2839
$20/yr.; NL; 2 SIGs; TS; TE: SL; BBS

Nashville Area PC Users Group
488 Saddle Dr.
Nashville, TN 37221
615/662-0322
$25/yr.; NL; 12 SIGs, TS; TE; SL; BBS

TEXAS

Central Texas PC Users Group
P.O. Box 10169
Austin, TX 78766-1169
512/835-9476
$36/yr.; NL; 13 SIGs; TS; SL; BBS

North Texas PC Users Group
P.O. Box 780066
Dallas, TX 75378-0066
214/746-4699
$24/yr.; NL; 40 SIGs; TS; TE; SL; BBS

Senior Education & Community Services Computer User Group
Tarrant County Junior College
1500 Houston St.
Fort Worth, TX 76102-6599
$20/yr.; NL; 2 SIGs; TS; TE; SL; BBS

Houston Area League PC Users,
1200 Post Oak Blvd. #106
Houston, TX 77056-3104
713/623-4425
$25/yr.; NL; 60 SIGs; TS; TE; SL; BBS

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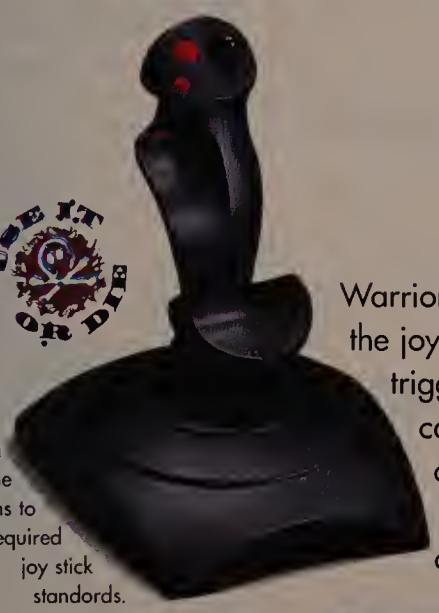

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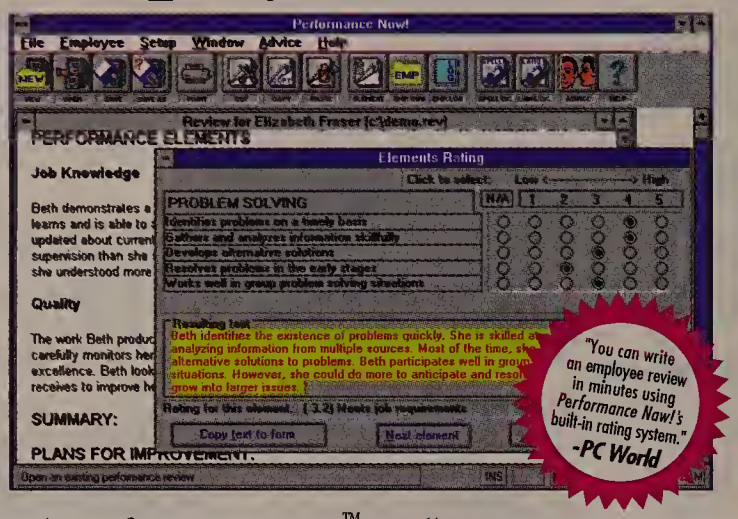

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Houston, TX 77002
713/223-4873
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Longview Computer Users Group
P.O. Box 150071
Longview, TX 75615
903/759-4036
$25/yr.; NL; 5 SIGs; TS; TE; SL; BBS

Ft. Bend Computer Users Group
1706 Hawthorn
Richmond, TX 77469
713/341-0220
No fee; 12 SIGs; TS; TE; SL

Alamo PC Organization, Inc.
P.O. Box 65180
San Antonio, TX 78265-5180
210/828-2526
$25/yr.; NL; 28 SIGs; TS; TE; SL; BBS

The Temple Area PC Club
4506 Old Howard Rd.
Temple, TX 76504-9610
817/778-8575
$15/yr.; NL; TS; TE; SL

Tyler Computer Club
3614 Peggy's Pl.
Tyler, TX 75701
903/561-6136
$20/yr.; NL; 6 SIGs; TS; TE; SL; BBS

UTAH

Southern Utah Computer Users Group
1242 S. 450 W.
Cedar City, UT 84720
801/586-3348
No fee; 1 SIG; TS; TE; SL; BBS

Utah Chip Computer Society
P.O. Box 510811
Salt Lake City, UT 84151
801/583-8544
$30/yr.; NL; 18 SIGs; TS; TE; SL; BBS

VIRGINIA

Tidewater User Group
529 Heather Dr.
Virginia Beach, VA 23462
804/499-7878
$20/yr.; NL; 4 SIGs; TS; TE; SL; BBS

WASHINGTON

Olympia Microcomputer User Group
1967 Orchard Dr.
Olympia, WA 98502
206/491-9041
$18/yr.; NL; 6 SIGs; TS; TE; SL; BBS

Tacoma Open Group for Microcomputers
1808 Lenore Dr.
Tacoma, WA 98406-1920
206/752-5582
$18/yr.; NL; TS; TE; SL; BBS

WEST VIRGINIA

Boot Hills PC User's Group
P.O. Box 686
Wheeling, WV 26003
614/633-5095
$25/yr.; NL; 2 SIGs; TS; TE; SL

WISCONSIN

Fox Valley Technical College Personal Computer Users Group
P.O. Box 2277, Mail Room 87
Appleton, WI 54913-2277
414/735-2470
$20/yr.; NL; 7 SIGs; TS; TE; BBS

Central Wisconsin Computer Society, Inc.
410 E. Main St.
Auburndale, WI 54412
715/652-3175
$15/yr.; NL; 2 SIGs; TS; TE; SL; BBS

Madison PC User's Group
P.O. Box 2598
Madison, WI 53701-2598
608/231-2725
$30/yr.; NL; 11 SIGs; TS; TE; SL; BBS

Milwaukee Area IBM PC Users Group
P.O. Box 2121
Milwaukee, WI 53201-2121
414/679-9075
$24/yr.; NL; 3 SIGs; TS; TE; SL

Rapid River PC Users Group
6848 Hwy. 34
Rudolph, WI 54475-9531
715/435-3495
$1/yr.; NL; TS; TE; SL; BBS

CANADA

Calgary PC User Society
P.O. Box 6, Station M
Calgary, Alberta, T2P 2G9
Canada
403/246-4691
$40/yr.; NL; 4 SIGs; TS; SL

Greater Victoria PC Users' Association
P.O. Box 5309, Station B
Victoria, BC, V8R 6S4 Canada
604/382-5293
$37.45/yr.; NL; 14 SIGs; TS; TE; SL; BBS

Winnipeg PC User Group, Inc.
Box 3149
Winnipeg, Manitoba
R3C E46 Canada
204/488-9796
$45/yr.; NL; 10 SIGs; TS; SL; BBS

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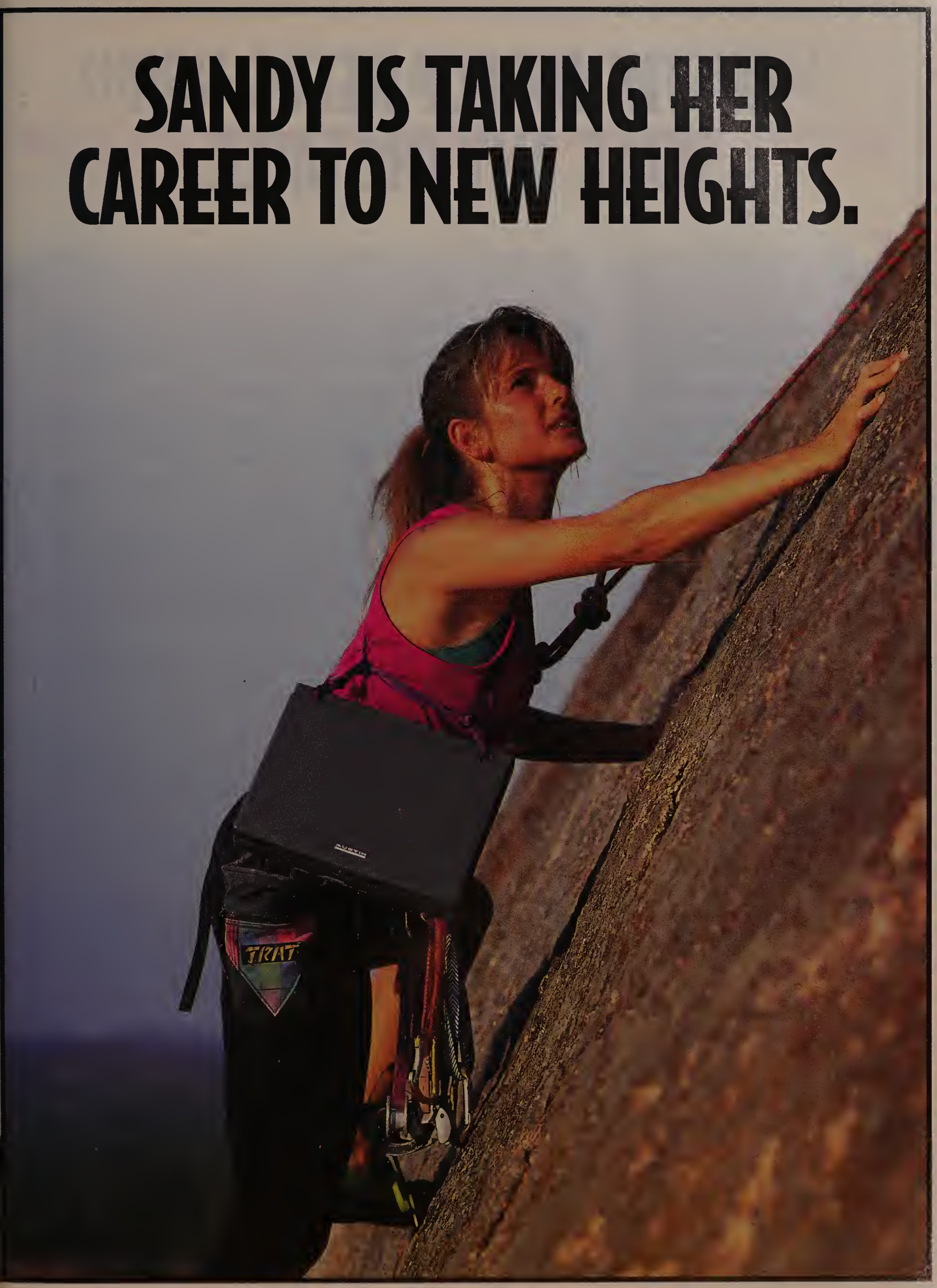

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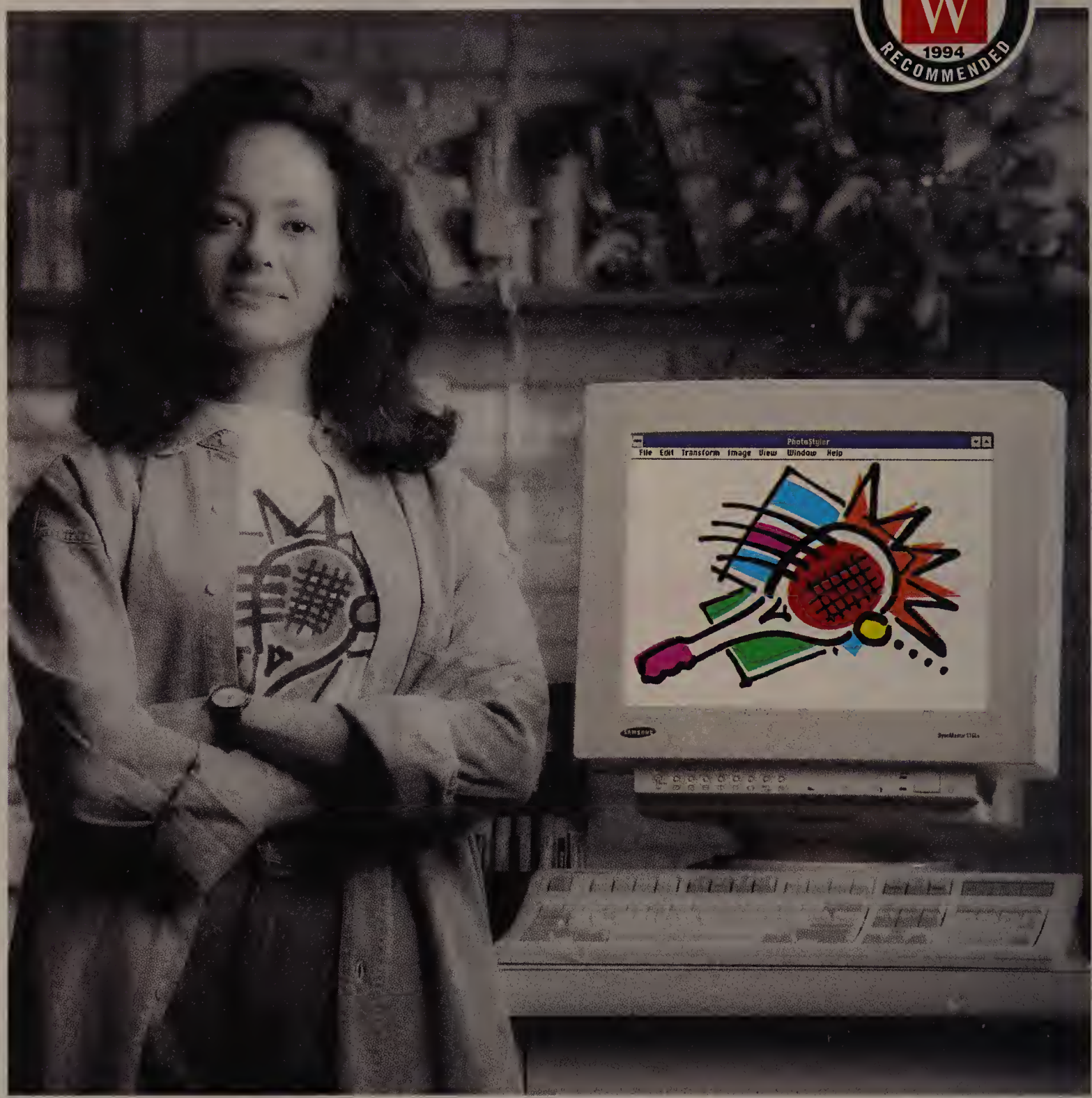

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Power Management	•	•	•	•
Flat Square Screen		•	•	•
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Special Effects Win New Customers

First there were cave drawings. Then came grease pencils and overhead transparencies. Next came the PC, presentation graphics software, and slide carousels. People are always looking for better ways to dazzle audiences.

Today, do-it-yourself presentations incorporating video clips can be as realistic as *60 Minutes*—and they can be more effective, easier, and cheaper to produce than the old-fashioned transparency-and-overhead-projector routine. This month Rob Stuart, communications coordinator in the Atlanta regional office of commercial real estate giant Cushman & Wakefield, describes how his company is redefining sales presentations with PC video-capture-and-playback technology. —*Ed.*

One Movie is Worth a Thousand Words

When companies need new products or services, they usually ask a few different vendors to each make a presentation demonstrating its ability to handle the project. For the most part, these competing vendors are all capable of doing the work. So how does one vendor win the assignment over another? Unless the vice president happens to know somebody who can provide the service, the decision often rests on a single presentation.

In my business—commercial real estate—we are regularly asked to make a presentation explaining how we would move a company into a new office space, lease its warehouse, or sell its shopping center. Regardless of whether the company is a small local manufacturer or a Fortune 500 firm, our presentation must be effective enough to get us the job.

In the past, preparing a presentation to show off real estate offerings was an expensive and frustrating experience. To create "tours" of potential commercial sites, our brokers would drive to the office building and take pictures of its interior and exterior. Then we would pay a service bureau to develop slides or enlarge and mount expensive color reproductions, including the logo of the project or client. Brokers and agents often had to work into the wee hours making the necessary last-minute changes to the presentation.

The cost of producing the photographs and the fat binders full of testimonials, specifications, and other materials added up to anywhere from a few hundred dollars to several thousand dollars. And because the logo of the prospective client was often placed predominantly on the mounted photographs, we couldn't reuse the photos in presentations that we made to other potential clients.

Rob Stuart, communications coordinator for the Cushman & Wakefield regional Atlanta office.

The High-Tech Fast Track

Though many of our likely clients rely on state-of-the-art computer technology, real estate itself has generally remained a low-tech business. In 1991 we decided to change that. We gave 50 new 486-based networked PCs to the brokers and staff in our Atlanta corporate offices. Before long a few forward-looking folks were using presentation graphics software—even adding on-screen animation to their presentations. Unfortunately, our competitors were doing the same thing. We won 60 percent of our bids, but nothing we did stood out.

One day I saw a magazine ad for the $500 Smart Video Recorder from Intel (800/538-3373). It includes a plug-in board and software to let you capture, edit, and play back video images on a PC. It seemed just what we needed to sharpen our competitive edge, so in October 1993 our office decided to invest in one.

We already owned a camcorder but needed a multimedia system, so we chose an $8000 Compaq 486 Portable with a 510MB hard disk, 16MB of RAM, a Sound Blaster card, a CD ROM drive, and speakers. We also bought a scanner and Asymetrix Compel presentation software. The total came to just under $12,000—a significant but easily justified outlay, since we spent that much money preparing presentations for a handful of prospects.

Talking Heads

Installing the video board was simply a matter of slipping it in and adjusting IRQ settings. Right away we were operating in a new dimension, creating movies rather than assembling presentations.

To create presentations now, we videotape a tour of the building. Then we plug the camcorder into the computer and press the camera's play button and the record button on Windows' Video

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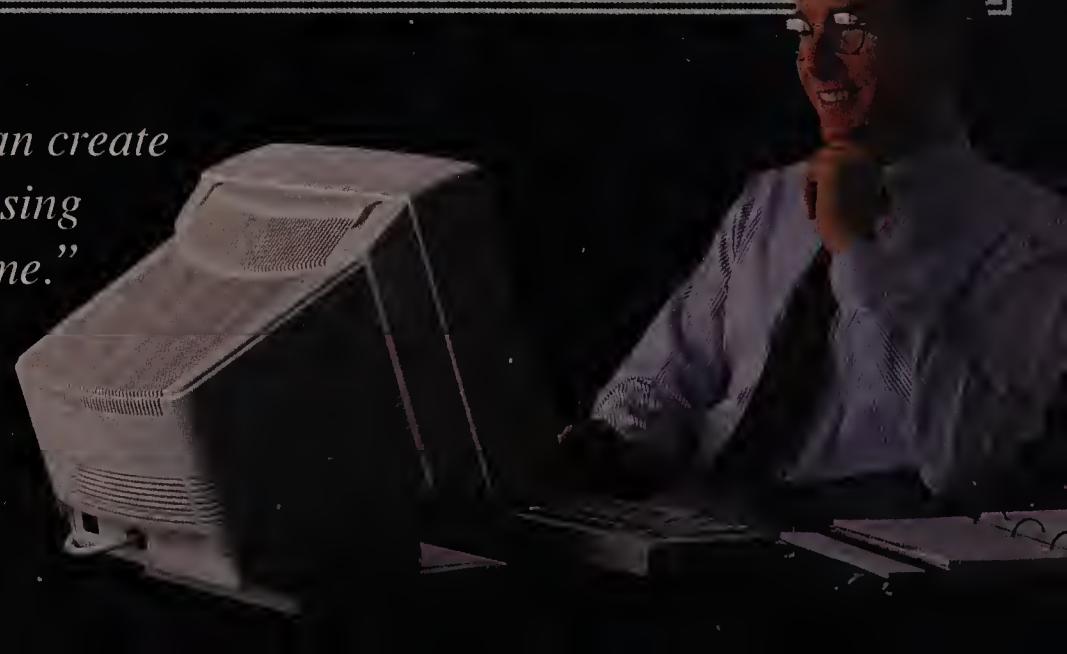

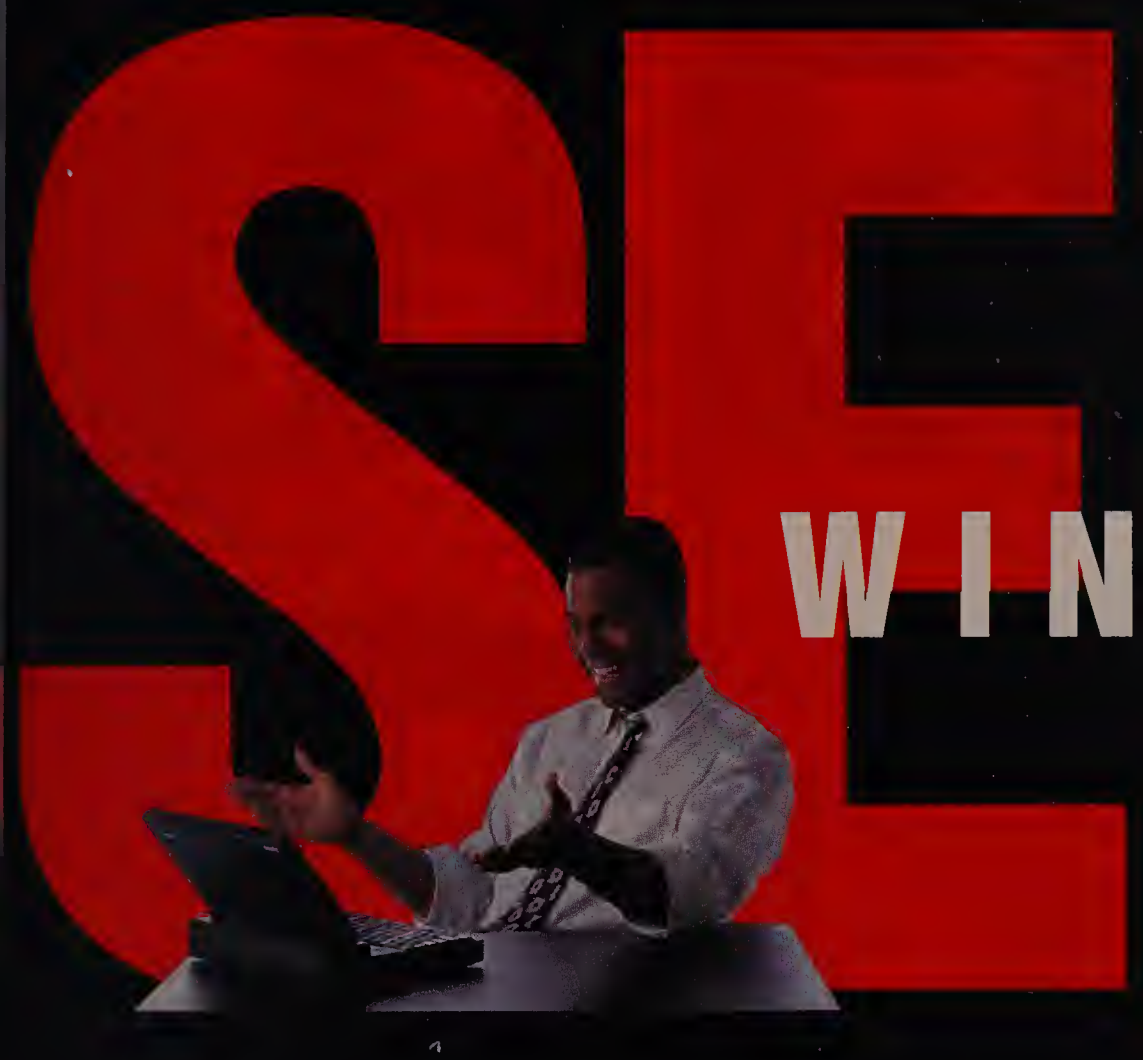

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Recorder software. Once the video is recorded, we can edit, copy, and paste it into any document. Then we import the finished clip into our presentation.

The presentations themselves are amazingly effective. We take our portable computer to the client's office and plug in a VGA monitor. Usually we start the presentation with a video clip to capture attention. For example, when trying to interest a potential investor in a shopping center located at a major traffic intersection, we show a video clip of cars racing by, slowly pulling back to show the center. And rather than trying to describe a building's classy lobby, we run a video tour. When we recommend that a client move its offices to a new city, our presentations are likely to include videos of local authorities discussing market forecasts and job growth in the area.

We also use the video technology to show tapes of past clients (with names and titles superimposed) recommending us. Watching and listening to them is infinitely more compelling than reading reference letters.

Since going high-tech, we've won 20 to 30 percent more bids. In addition, we save at least $500 a month because we don't have to pay for slide preparation. And we no longer write proposals, copy them, and put them in binders. Instead, we just print the presentation screens to a color printer. We can keep customizing the presentation right up until the meeting, and no one has to work all night making copies.

Of course, we're not naive enough to think this technology will keep us ahead of the competition forever; it's only a matter of time before everybody's doing it. To stay on the cutting edge, we are now in the process of combining these flashy video presentations with an existing financial analysis program developed in our New York headquarters. This new system not only will have all the sizzle of our current presentations but will be able to calculate instantly, for example, how a lease in a certain building would affect a company's per-share earnings. In the cost-conscious nineties, this kind of detail and analysis is increasingly important.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources, we want to hear from you (see page 12 for contact information).*

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PC World—July 1994

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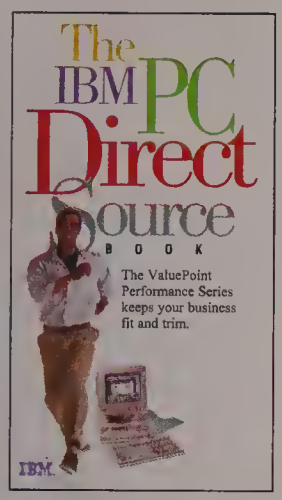

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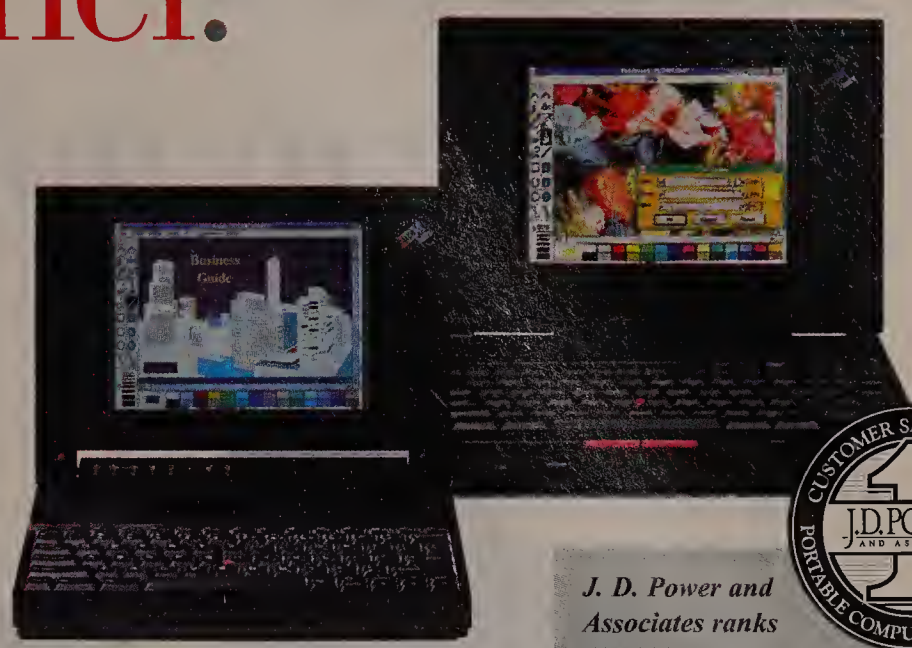

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Software to Create a Dream Team

Here's a plug for the neatest piece of software that I've seen in a long time: It's Collabra Share, and it's a bulletin board system that's built atop the electronic mail system you already have. It's simple yet powerful enough that many companies not ready to make a commitment to Lotus Notes will find what they need in Share.

Groupware applications are intended to improve the effectiveness of work groups by improving communication among team members. It's a category that appears to be gaining momentum despite being criticized as too expensive and too time-consuming to set up and learn (see "Secrets to Building an All-Star Team" in *Top of the News*).

Share changes this. This sleek package offers message-based conferencing essentially out of the box, and at a low cost. It sells for between $59 and $69 per user; an optional connection to external electronic mail costs $899 per server for unlimited users. For that price, you get Windows-based client software for your desktop machines, and server software that runs alongside any VIM- or MAPI-compliant mail system, such as Lotus cc:Mail or Microsoft Mail. Anyone who can maintain an E-mail system or a Novell network shouldn't have too much trouble getting Share up and running. Typical installation time is about half an hour, plus the time it takes to create additional mailboxes on your existing system.

Share lets users create shared notebooks or electronic conference centers analogous to the discussion forums found on online services. The conference centers can contain folders of messages related to specific topics or projects, and no network administrator need be involved. Share provides full-text searching and also lets users post reports, documents, and schedules in the conference centers.

While Share currently offers client software only for Windows-based systems, the mail gateway supports any user who can send and receive E-mail from your system, whether via the Internet, MCI Mail, IBM PROFS or other mail systems. Remote users can also receive lists of messages and do full-text searching across E-mail.

My main complaints about Share are that it doesn't allow anonymous postings (which means it wouldn't be a great place for a corporate suggestion box), that it needs better support for remote dial-in users, and that it should support more types of client software. I'd love to see Share support Macintoshes and UNIX-based machines (a Mac client is due to ship in the first quarter of 1995). Better links to Internet newsgroups would also be nice; Collabra is working on an Internet news agent that seeks out information for you. • *Collabra Software; 800/474-7427. Reader service no. 819*

The New Mosaic

I wish I could drop a fast Internet connection into every reader's office or home just so they could play with Mosaic, the Internet graphical user interface so many net surfers have been talking about. The Mac and Windows versions, however, are really slow unless you're connected directly to the Internet at 56 kilobits per second or higher.

But there's good news: Marc Andreessen, the 23-going-on-35-year-old who invented Mosaic, is out of college now and hard at work on new versions of the Mosaic client and server software. Mosaic Communications Corporation in Mountain View, California, has the backing of Silicon Graphics founder Jim Clark and promises the new software early next year. With more reasonable processing requirements, Mosaic could spawn an entire new segment of the Internet industry by offering a single interface to a variety of commercial and public services.

Contributing Editor David Coursey edits P.C. Letter. *He can be reached on PC World Online (see page 12 for contact information).*

LOOKING AHEAD

Desktop accounting software is, for the most part, about as exciting as an afternoon of paying bills. So it's not surprising that the company that made paying bills tolerable is doing the same for small-business accounting. Watch for a new version of Quicken's Quickbooks for Windows to ship this month. The other neat product in this category is Peachtree Accounting for Windows 3.0. I recommend both...You've heard about Plug and Play, which is supposed to automate hardware setup, but you probably haven't heard about the Desktop Management Task Force. DMTF is building standards for applications so that they can properly interact with other programs as well as keep your system software configuration up-to-date. DMTF-compliant applications should start showing up next year...Want to build your own Mosaic home page? Send me E-mail and I'll send notes about what my office has been up to...Symantec is the *other* company that should hit the jackpot with the release of Chicago. All those copies of Norton Utilities to be upgraded—it's mind-boggling.

By David Coursey

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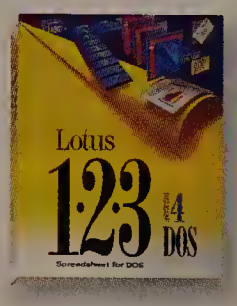

the comfortable feeling of the 1-2-3 you know and love. It does this without the expense of upgrading hardware or the time of retraining. And it's 100% compatible with all past 1-2-3 versions.

1-2-3 R4 for DOS incorporates user suggestions like Column Fit-Widest, a feature that automates column formatting to accommodate the biggest entry; a built-in

*$119 upgrade price direct from Lotus. Offer good while supplies last. **For volume purchase information, inquire about Lotus Passport. In Canad

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As for ease of use, you get many of the graphical interface features that make our Windows™ products so popular – like a Live Status Bar for easy access to fonts, styles and other settings; Worksheet Tabs that make navigating between spreadsheets easy; and more SmartIcons® than ever, for one click access to the most crucial features.

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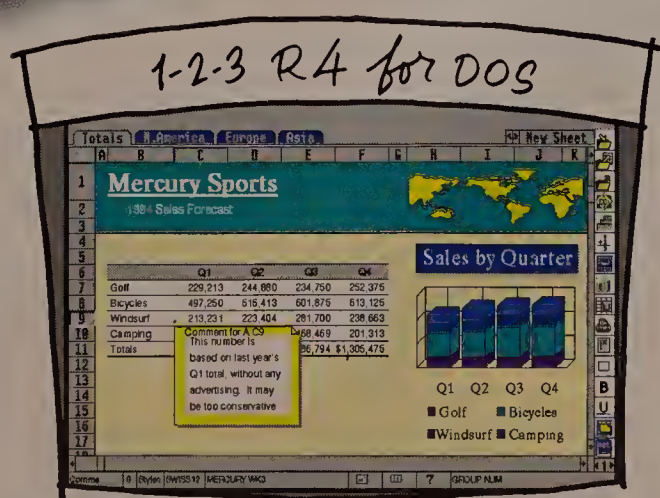

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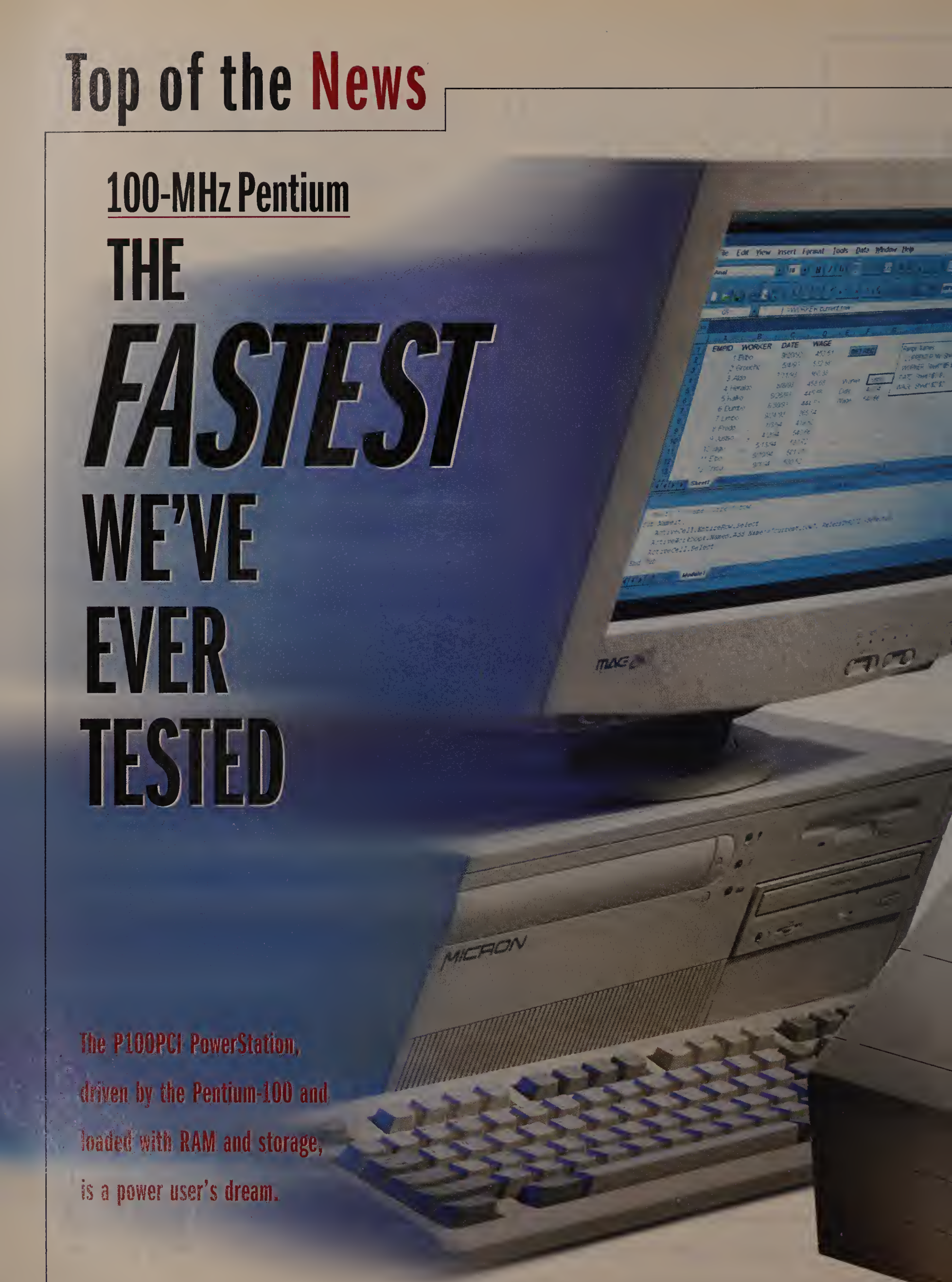
100-MHz Pentium

THE *FASTEST* WE'VE EVER TESTED



The P100PCI PowerStation, driven by the Pentium-100 and loaded with RAM and storage, is a power user's dream.

Edited by Russell Glitman

TEST DRIVE

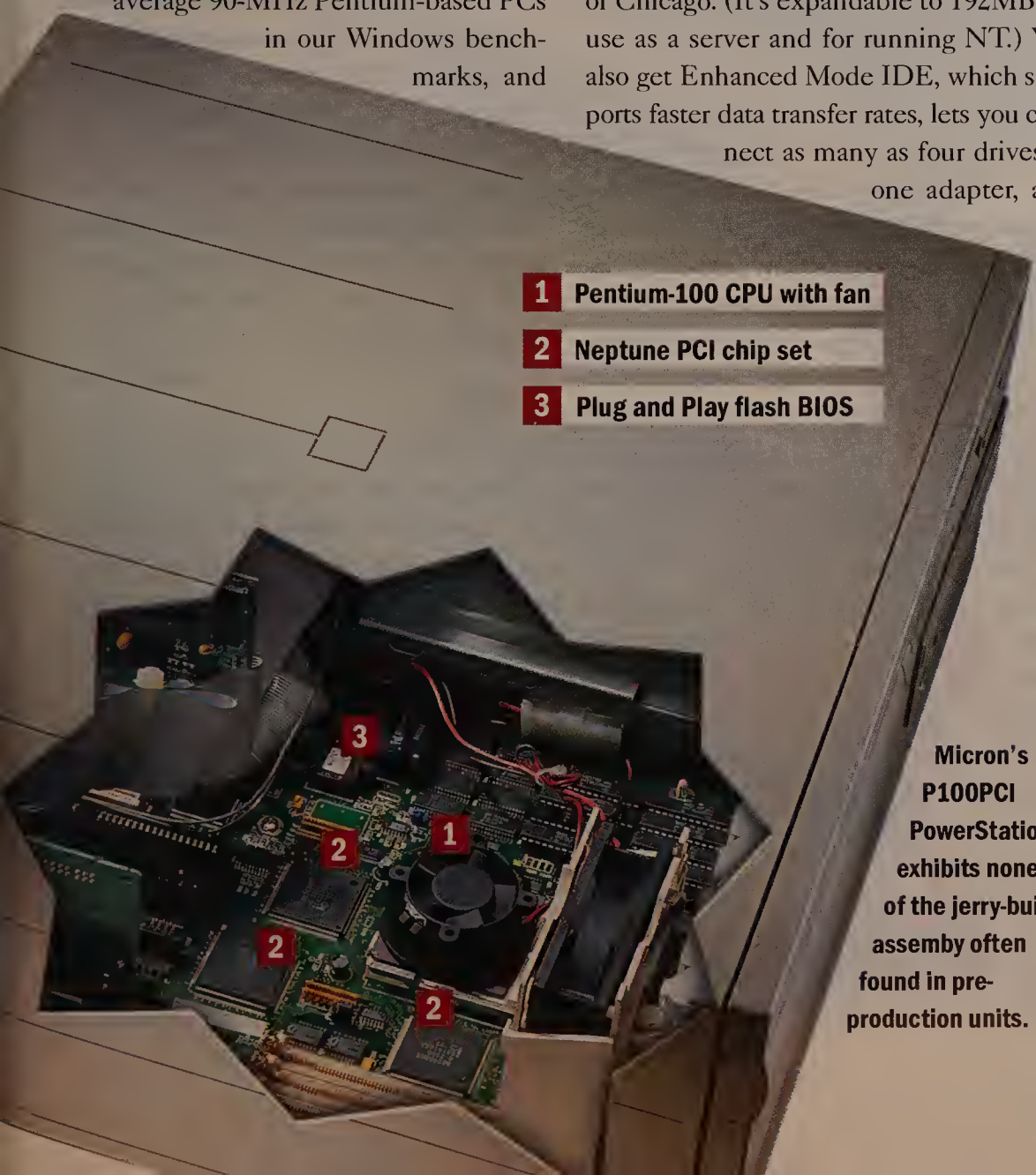
The task of evaluating processor specs just got easier: Get a system with Intel's 100-MHz Pentium, and you'll be the power leader on your floor. Eight months after the chip was announced, we got our first look at the elusive but powerful Pentium-100 in a Micron PCI desktop. It turns out to be the fastest Windows PC we've ever tested, with an amazing price—$3798. And wait until you hear about the configuration.

Micron Sets the Pace

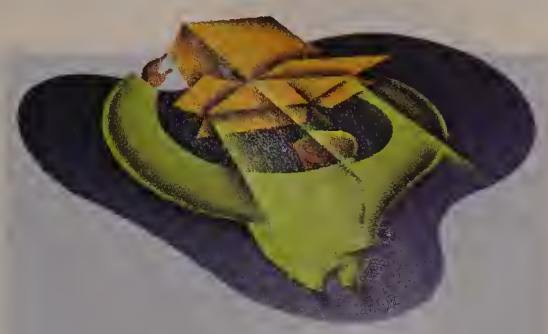
Due in November, the P100PCI PowerStation is a groundbreaker, the first desktop to showcase Intel's top-of-the-line Pentium.

Built around a Micronics motherboard, with Intel's Neptune PCI chip set and 16MB of RAM, the Micron P100PCI PowerStation we tested featured a robust Diamond Stealth 64-bit graphics accelerator with 2MB of VRAM. Overall Windows performance was 14 percent higher than the average 90-MHz Pentium-based PCs in our Windows benchmarks, and better than the 10 percent improvement over the Pentium-90 chip the majority of PC vendors we surveyed told us to expect. The results on our DOS-based Lotus 1-2-3 test were less impressive. But keep in mind that after a certain threshold, a blur is just a blur. For tasks from 3-D modeling and financial analysis to advanced multitasking, processing speed is money in the bank. If you want optimal Windows performance and don't run DOS apps, Micron will custom-configure the P100PCI PowerStation with a 64-bit Matrox MGA II graphics accelerator. This configuration yielded slightly faster Windows performance than with the Stealth 64, with a corresponding hit in DOS applications, according to *PC World* tests.

The P100PCI PowerStation exhibits none of the kludges common in preproduction units of first-to-market products. The Phoenix flash BIOS conforms to the current Plug and Play specification and is software upgradable. In its standard configuration, the PowerStation comes with 16MB of RAM—plenty of memory for Windows 3.11 or Chicago. (It's expandable to 192MB for use as a server and for running NT.) You also get Enhanced Mode IDE, which supports faster data transfer rates, lets you connect as many as four drives to one adapter, and



Micron's P100PCI PowerStation exhibits none of the jerry-built assemby often found in preproduction units.



News Monitor

LET THE PRICE WARS BEGIN: Another round of dramatic price cuts is roiling the PC market. The battle was triggered by Compaq, which slashed prices up to 22 percent on most desktop and notebook models in mid-August. A week later, IBM responded by cutting its prices up to 27 percent. Analysts believe Compaq may return the salvo, and IBM is reported ready to return fire again. That could set the stage for across-the-board price cuts, as smaller vendors move to maintain their price advantage over the market leaders. According to Robert Corpuz, an analyst at market research firm Dataquest in San Jose, California, 60-MHz Pentium systems that now sell for $1999 on the street could drop to as low as $1799 by the end of the year.

WITH E-MAIL, IMAGE IS EVERYTHING: You know about dressing for success—but do you know how to E-mail your way to the top? Writing effective E-mail has become vital to your corporate image and career, says Deborah Dumaine, president of Better Communications, a Massachusetts company that provides E-mail writing seminars. Now that E-mail is widespread and popular, she says, we're competing to get our messages read, and we're forming opinions of one another based on our electronic communications. Her tips:

- Before you write, decide who really needs to get the message.
- Write an action-oriented subject line such as "We should attend this conference," not "Conference info."
- Lead the message with the most important information.

(continued on page 59)

PHOTOS: JOHN GREENLEIGH; PHOTO ILLUSTRATION: JEFF BERLIN; ILLUSTRATION: JEFF KOEGEL

accommodates as much as 8.4GB of storage. The PowerStation comes with an Enhanced IDE 527MB hard drive. A 15-inch Mag monitor comes with the system, along with a 1.44MB floppy drive. And the Mitsumi double-speed CD-ROM drive is standard issue.

Micron designed the PowerStation with thought for the future. To ensure CPU longevity, Micron includes a CPU fan on the Pentium, even though it already runs at a cool 3.3 volts. A second front-mounted fan just a few inches from the chip provides constant airflow.

Upgrading is easy. Nothing blocks access to the three PCI slots, one of which is occupied by the Diamond Stealth card. The four ISA slots are likewise clear, although you can't add full-length cards to any of these slots. There are three free internal and one free external drive bays.

Adding an internal drive is also easy—the 3½-inch bay mountings are vertical to the floppy drive cage—but to add a 5¼-inch floppy or tape drive you must remove the drive cage to access the empty 5¼-inch bay.

Bundled CD-ROMs include Windows for Workgroups 3.11 and Microsoft Office 4.2, both preinstalled. Micron's run-of-the-mill one-year parts and labor warranty is made a little more palatable by the inclusion of a year's free on-site service from Micron. Technical support is available every day except Sunday.

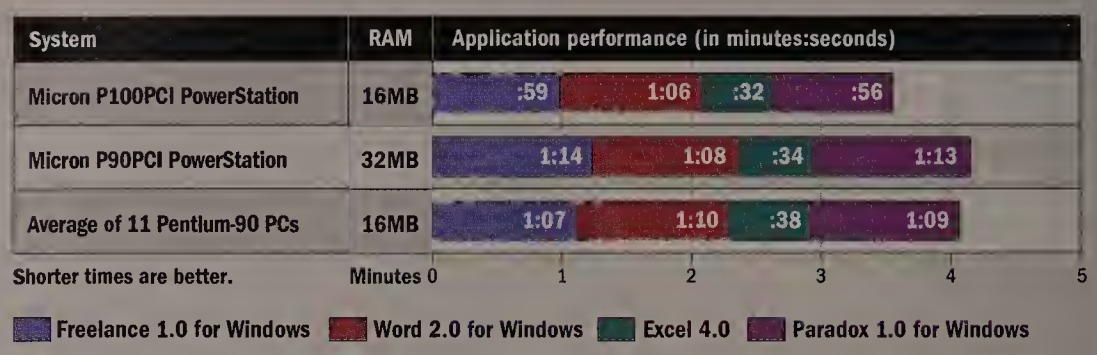
The systems are also available in minitower and tower configurations.

Micron P100PCI PowerStation

Key Features: First 100-MHz Pentium Windows system • 64-bit graphics accelerator • Double-speed CD-ROM drive
Pricing: $3798
Availability: November
Micron Computer, 800/223-6571
Reader service no. 850

TEST REPORT

The Fastest PC: Micron's 100-MHz Pentium Wows Windows



Tests run on preproduction unit. PC World Test Center application benchmarks.

The New CPU

A year ago, 66 MHz was the high-water mark for CPU clock speeds. Pentium had just arrived on the scene, and for $3900 the PC power junkie could gloat over a new Pentium-60 loaded with 8MB of RAM, a 170MB hard drive, and a 14-inch super-VGA monitor. Since then, PC manufacturers have taken technology to new heights while the market has driven prices down.

By the end of the year you can expect to see fully loaded multimedia Pentium-60 PCs on our Top 20 Budget Desktops PC list priced at less than $2000. Intel's 100-MHz Pentium is now the chip to beat among stand-alone desktop PCs, with Micron's P100PCI PowerStation the first desktop system due to arrive on the scene. Micron's desktop joins Pentium-100 servers from ALR and Dell already on the market.

Your selection of Pentium-100s should expand rapidly late this year when Intel promises a ready supply of 100-MHz Pentium chips and corresponding chip sets. Systems using the PowerPC, Cyrix's M1, and NexGen's Nx586 are waiting in the wings, but they're not here—or tested.

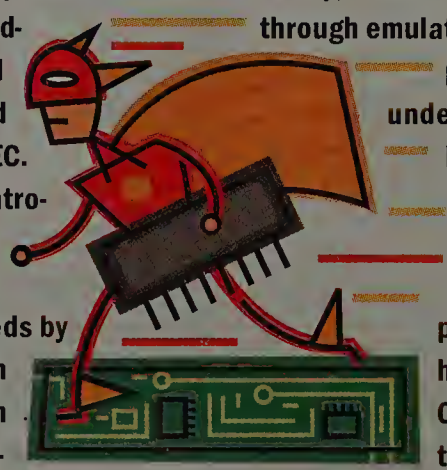
If you want the leader this fall, dial Micron's number.

—Susan Silvius

DEC CPU Runs at 300 MHz:

Digital loves fast processors as much as Dave Thomas loves cheeseburgers. Running at 266 MHz and 300 MHz, Digital Equipment Corporation's new Alpha 21164 RISC processors could make the speed-hungry swoon. The first 266-MHz Alpha-based systems will be available in January 1995, followed by the 300-MHz systems in March, according to DEC. The company will be among the first vendors to introduce machines based on the chip, says analyst Dean McCarron of Mercury Research.

In a raw chip-to-chip race, the new Alpha speeds by existing processors, issuing instructions faster than Intel's speediest Pentium. But the Alpha, which includes 96K of write-back cache, is unlikely to propel DEC past Intel in the PC market. The reason: While the Alpha chip runs Windows NT, UNIX, and Open VMS operating systems directly, it runs Windows 3.1 and the upcoming Chicago only through emulation, which means you won't get the chip's peak performance. DEC estimates that performance under emulation will be comparable to that of a 60-MHz Pentium. The company also claims that the chip will sport almost twice the integer performance of the PowerPC 604.



Vendors will use DEC's 300-MHz Alpha chip primarily in high-end application servers and some high-end PCs aimed at people who do engineering, CAD, or intensive graphics work. DEC estimates that these systems will cost $3000 to $5000.

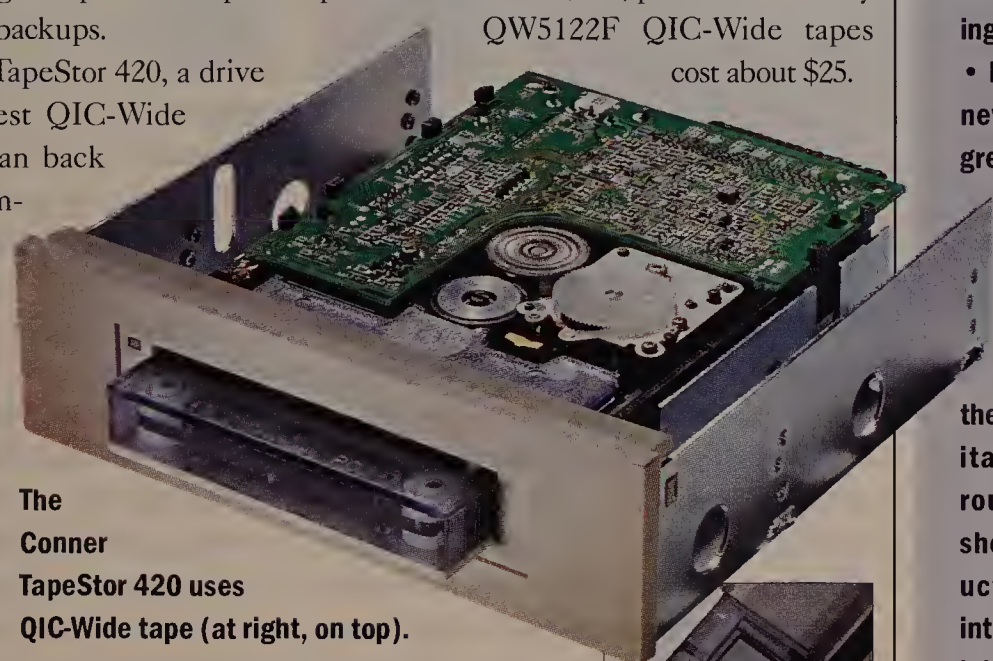
GORDON STUDER

Easy Backup for Windows

TEST DRIVE

Everybody wants data security, but nobody wants to shell out big bucks for a tape backup drive. As a result, internal QIC-80 minicartridge drives that sell for less than $200 remain the mainstream choice—although the most their tapes can store is about 250MB of compressed data. That limitation is creating a problem on business desktops, where the average hard disk capacity now exceeds 300MB. You see the conundrum: Most hard drives can hold more data than fits on a tape—making it impossible to perform unattended full backups.

Enter the Conner TapeStor 420, a drive that uses Sony's latest QIC-Wide minicartridges and can back up 210MB of uncompressed files (or up to 420MB using compression software). The versatile new TapeStor can also use QIC-80 and Irwin AccuTrak 250 media; when it prompted me for a new tape after filling my QIC-Wide media with multiple backups, I swapped in an old QIC-80 tape and finished the backup without a hiccup. And the $199 list price (about $179 on the street) for an internal drive with minicartridge beats those of inexpensive QIC-80 models.



The Conner TapeStor 420 uses QIC-Wide tape (at right, on top).

JEFF KOEGEL

Installation was a breeze. I simply connected my PC's floppy drive cable to the internal TapeStor unit and then hooked it up to a spare power connector and shoehorned it into a free 1-inch-high, 3½-inch, externally accessible bay (or you can use the included adapter to fit a 5¼-inch bay). Then I installed the Conner Backup Exec 2.0 for DOS and Windows, which is similar to Norton Backup, and I was done.

Considering its price and ample capacity, the TapeStor 420 is a great drive. A parallel-port model lists for $379; preformatted Sony QW5122F QIC-Wide tapes cost about $25.

And if your hard drive is even bigger, Conner has other minicartridge offerings, such as the 850MB TapeStor 850 internal and parallel-port models, which list for $349 and $529, respectively. The internal floppy-interface unit stores up to 700MB on QIC-3010 media or 850MB using QIC-Wide tapes. In addition, the SCSI TapeStor 4000 internal and external models, listing for $659 and $799 (without adapter), can back up even more. Their 3.2GB-to-4GB estimated capacity using QIC-3080 and QIC-Wide tapes, respectively, makes these devices a low-cost alternative to DAT drives.

—Rex Farrance

Conner TapeStor 420

Key Features: Up to 420MB capacity • Compatible with QIC-80 and AccuTrak 250 media • Very low cost
Pricing: internal model $199; parallel-port model $379
Availability: Immediate
Conner Tape Products Group, 800/626-6637, 714/641-1230
Reader service no. 851

News Monitor

(continued from page 57)

- Use a tone of address that's appropriate to your recipient.
- Use subheads, such as "Action Requested," or "Next Steps," to break up long messages.
- Try to give negative feedback in person, since E-mail can make bad feelings fester.
- If you have to give a colleague bad news, sandwich it between a friendly greeting and closing.
- If you write a message when you're upset, let it sit for a while, then reread it before sending it.

PDA—DOWN BUT NOT OUT: Though the market for pen-based personal digital assistants has been flat, a new round of personal communicators should generate interest in this product category. In August, BellSouth introduced Simon, its combination cellular communicator and personal organizer. The Envoy, developed jointly by Sony and Motorola using General Magic's intelligent search agents and AT&T's PersonalLink marketplace, is due in October.

To date, PDAs have not been popular. Sales of the Newton and the competing Tandy Zoomer continue to be sluggish, according to Jenni Ceurvels, senior analyst with the market research firm BIS Strategic Decisions. Only 97,000 units are expected to sell this year. (Palmtop computers, a similar but more mature market dominated by the Hewlett-Packard 100LX and 200LX, are expected to sell 263,000 units this year.)

(continued on page 61)

Top of the News

Secrets to Building an All-Star Team

MAKING IDEAS FLOW: Paul Burkhalter coordinates his work group to enhance collaboration.

ALAN S. WEINER

It's imperative that ideas and data flow freely." So says Paul Burkhalter as he wrestles with coordinating a group of 17 scientists, writers, and research analysts at the Georgia Department of Natural Resources. Burkhalter, a division director in the department's Atlanta headquarters, is trying to get his work group to share ideas and listen to each other so they can jointly write the department's 60-page strategic plan for fiscal 1996. That wouldn't be so difficult if they were all cubicle colleagues, but they're not; Burkhalter's group is scattered across the state. And the report is due by year-end. No matter—they still must review and comment on each other's work and progress. Brainstorming is an integral part of the group's collaborative effort.

To encourage the exchange of ideas, Burkhalter at first turned to the department's existing E-mail package, WordPerfect Office, but encountered problems: With E-mail, members had to send documents to each other for comments, so instead of having a single master document that listed everyone's suggestions, the group spawned a collection of separate documents—each with different comments. There was no easy way to see everyone's responses in one place, and the result was confusion and crossed signals.

Burkhalter gambled on a preproduction copy of DCA's OpenMind groupware application. The results were astounding. "I don't think I've ever seen this level of cross-pollination of ideas before," Burkhalter says. "We're seeing lots of good ideas that would have never occurred to me." With OpenMind, staff members can read documents and attach responses in the same location. This ability provides the equivalent of one giant online meeting. Most important, because responses are *threaded* (linked), comments are easy to follow, and brainstorming is improved.

"I don't think I've ever seen this level of cross-pollination of ideas before," says Burkhalter of his group's experience using DCA's OpenMind.

Burkhalter and his group are among the many converts to a new style of collaborative computing—dubbed *groupware*—that lets groups of people manage information as well as each other. Analysts estimate that as many as 2 million people are now linked via groupware products, a number that is expected to double next year.

Groupware first appeared about four years ago in the form of Lotus Notes (which now claims almost 1 million users in more than 3000 companies). Groupware offers one or more of the following features: group scheduling, which lets employees post a copy of their schedules on the network, so managers can more easily monitor workloads and schedule meetings; work-flow automation, which gives a structure and flow for work and information within a group; document management, which provides a way to store, manage, and retrieve documents so everyone has access to the data; and conferencing, which lets users post messages and data in a central location so others can read and respond to them—a feature similar to the electronic bulletin boards offered by online services.

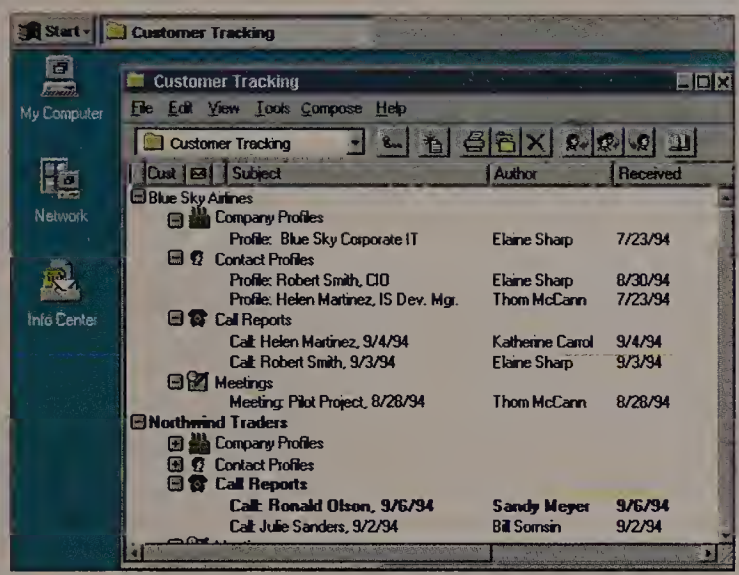
Conferencing is the most popular use of groupware, according to a June 1994 survey of 186 clients conducted by the Gartner Group, a market research firm based in Stamford, Connecticut. In addition to OpenMind, notable groupware products offering conferencing features include Lotus Notes, Collabra's Collabra Share, and the recently announced Microsoft Exchange Server. Collabra Share and OpenMind are strictly conferencing products that include rudimentary document management. OpenMind's document management is somewhat stronger, and the package also has network administration features; Collabra Share offers excellent

remote access and may appeal to smaller, widely dispersed groups (see this month's *Inside Source*). Microsoft Exchange Server, a more comprehensive product, is expected to offer conferencing plus high-end capabilities such as scheduling and work-flow automation. Exchange Server is scheduled to ship in 1995.

Intelligence Is the Key

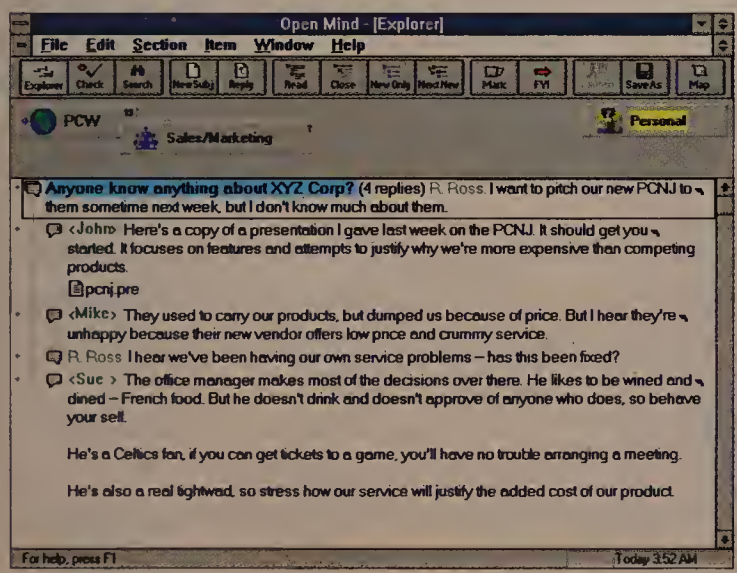
OpenMind's and Microsoft Exchange Server's conferencing features let the average user easily create shared directories to which everyone in the organization has access. These "intelligent" directories enable employees to perform several important functions that keep information flowing around the company.

An intelligent directory facilitates group discussions. For example, you could create a Sales directory and then post a message asking about the best way to pitch a certain product to a new client. Your question may soon generate responses from product designers, marketing staff familiar with the competition, and finance people who have knowledge of the client's credit history. As people respond to these comments, the discussion develops into a brainstorming session. Responses are automatically grouped into a collection of related comments—or a thread. The thread is organized hierarchically into a graphical tree structure, in which related information is grouped and linked to the original message. This makes reading and responding to each other's comments logical and easy. In addition, the discussion is maintained in a single shared directory, so there is one copy to which everyone involved has access.



THIS CUSTOMER TRACKING DIRECTORY in Microsoft Exchange Server lets users collect and share information.

By contrast, using E-mail to conduct discussions among multiple participants typically results in a string of appended messages intermingled with other E-mail messages. When the discussion is over, each participant may have a slightly different version, and only those on the address list know that the session ever took place. This can wreak havoc on group projects, as Burkhalter discovered before he tried OpenMind. Some E-mail packages, such as Lotus's cc:Mail, let network administrators create shared "bulletin board" directories. However, the bulletin boards lack the threading features that organize discussions by topic.



DCA'S OPENMIND LETS YOU see the relationship of threaded responses and view multiple responses simultaneously.

JEFF KOEGEL

An intelligent directory can also act as a central library for documents. In addition to discussions, the directory can hold critical files that are regularly updated and frequently used by numerous people. Prime examples include product presentations, company personnel policies, and revenue projection spreadsheets. Document management features let you set access rights that prevent unauthorized

News Monitor

(continued from page 59)

YOU'VE GOT TO KNOW WHEN TO FOLD: **IBM is terminating its Ambra direct-channel PC company, Lotus is discontinuing development of its Improv spreadsheet, and Intel is closing parts of its modem business. Ambra will shut its doors at the end of October, though the IBM PC Company will honor all Ambra warranties and continue to support the machines, says spokeswoman Anne Marie Clark. The Ambra shutdown is one part of an IBM PC Company reorganization designed to strengthen the IBM brand name. A possible result: IBM may introduce a unified brand name for all its desktop PC's as early as this fall, says analyst Randy Giusto at BIS Strategic Decisions. Lotus has ended development of Improv—its data-modeling spreadsheet—and will incorporate some of Improv's features into future releases of 1-2-3 and Approach, says Lotus spokesman Peter Cohen. The company will honor all support agreements for Improv and will offer Improv customers the chance to buy 1-2-3 release 5.0 and Approach 3.0 for $59 for both, Cohen says. Meanwhile, Intel stopped development on its low-end Intel fax-modems and will no longer sell its cellular PCMCIA modems under its own name. Intel will honor all existing warranties, says Jon Jackson, Intel press relations manager. The company will continue to sell its SatisFaxtion modems and plans to introduce a new line of voice/data modems by end of the year, he says.**

Edited by Randy Ross
Contributors: Joe Abernathy, Jeff Bertolucci, and Laurianne McLaughlin

people from altering or even reading the files. (These attributes are set by the person who created or oversees the directory.) Related features allow you to locate documents with search tools that can check the contents of a directory based on keywords. The search capabilities become even more useful as the directory increases in size (and value to your company). If, for example, a salesperson wanted to pitch the branch office of an existing client, he or she could request all documents containing the client's name. The search might turn up spreadsheets, presentations, and even discussions, such as the online meeting described above.

Synchronizing Data

Other features of these groupware products help prevent administration headaches. A feature called *replication* synchronizes the contents of directories shared by disparate offices connected over a wide area network (WAN). Popularized by Lotus Notes, replication copies changes to the shared directory—new documents, new versions, new discussions—even if the offices do not have a "live," or real-time, connection.

OpenMind, Microsoft Exchange Server, and Lotus Notes each consist of two pieces of software: one that runs on a dedicated PC or server, and one that runs on each user's Windows PC or Macintosh. This client-server architecture, not found in Collabra Share, makes backing up and other tasks easier for the network administrator. The architecture also provides improved performance over WAN and remote dial-up connections.

OpenMind

If sharing documents and providing forums for group discussions is your main goal, OpenMind may be all you need. Like its closest competitor, Collabra Share, the product is powerful yet easy to use. For example, if you want to find all documents that mention a certain client, OpenMind searches the contents of all discussions and documents created in it, as well as text in attached documents, such as word processing files, spreadsheets, and presentations. (Microsoft Exchange Server and Lotus Notes can't search the contents of attached files.)

OpenMind's version management features help you track documents and modifications—particularly useful when you have numerous people working on the same file. It also provides viewers for documents created by common word processors and spreadsheets. Collabra Share lacks both of these features.

OpenMind has limitations. It boasts no high-end groupware capabilities (such as a programming language), nor does it offer work-flow features, which means it can't automatically route documents to associates in a predefined order. As a result, information systems departments can't create complex applications for automating business tasks. Lotus Notes offers these features, and Microsoft Exchange Server is expected to as well. And OpenMind falls short in one other key area: Interaction among users is restricted to those with the product (whereas Collabra Share lets users of popular E-mail programs participate in group discussions). OpenMind ships in September and costs $275 per user and $995 for the server software (you'll need Windows NT).

Microsoft Exchange Server

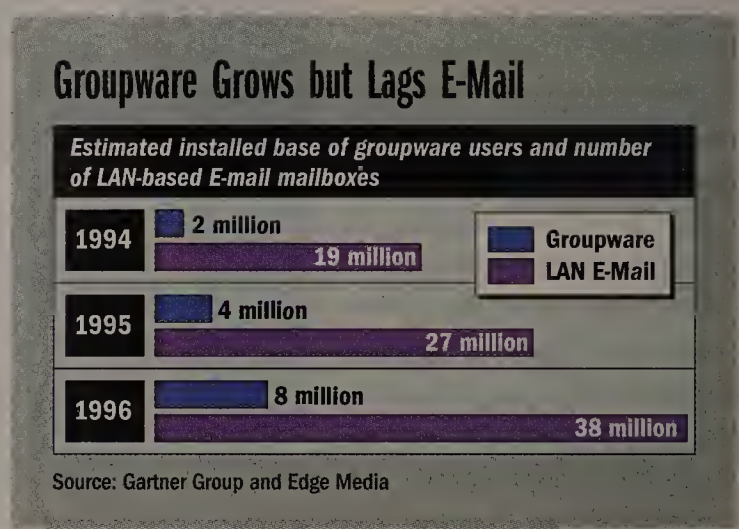
For those seeking advanced groupware features, Microsoft Exchange Server may be worth waiting for. Key features: group scheduling that lets you check co-workers' calendars to schedule meetings, forms for collecting and viewing data, and rudimentary work-flow and application development capabilities for automating office tasks.

Though it's too early to compare Microsoft Exchange Server and Lotus Notes feature by feature, the former is expected to offer at least one significant advantage: More third-party apps are expected to work with it, says Tom Austin, groupware research director for the Gartner Group.

Like Notes, the Microsoft product is unable to search the contents of documents or attachments created in other applications, and it is not expected to include version management features. Finally, the product includes (and requires) Microsoft Mail; other popular packages, such as Lotus's cc:Mail, will not work with Microsoft Exchange Server. (Similarly, Notes won't work with Microsoft Mail; it requires a VIM-compliant product, such as Notes Mail or cc:Mail.) Collabra Share and OpenMind are more flexible: Both work with cc:Mail and Microsoft Mail.

The client software for Microsoft Exchange Server is expected to sell for about $120 and will be incorporated into Chicago. The server component will cost about $595 and will require Windows NT.

—Randy Ross



Two Approaches to Groupware

OpenMind

Key Features: BBS-like discussion forums • Document sharing and management • Full-text search for attached documents • Version control • Document viewers

Pricing: $275 per client for 10 users ($225 per client for 100 users), $995 per server

Availability: September

Digital Communications Associates, 800/348-3221

Reader service no. 852

Microsoft Exchange Server

Key Features: BBS-like discussion forums • Document sharing • Some document management • Group scheduling • Application development language • Routing and rudimentary work-flow capabilities

Pricing: About $120 per client (included free in Chicago), $595 per server

Availability: First half of 1995

Microsoft Corp., 206/882-8080

Reader service no. 853

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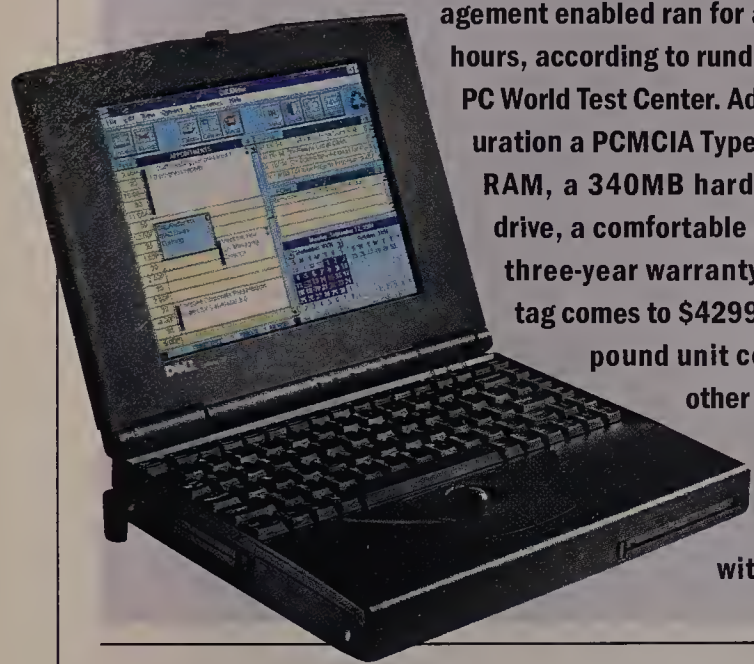


Longest Battery Life Ever: Dell Computer's new Latitude XP notebooks are a workaholic's dream. A preproduction DX2-50 model with a 9.5-inch active-matrix display and power management enabled ran for an astounding 7 hours, according to rundown tests by the PC World Test Center. Add to that configuration a PCMCIA Type III slot, 8MB of RAM, a 340MB hard drive, a floppy drive, a comfortable palmrest, and a three-year warranty, and the price tag comes to $4299—making this 6-pound unit competitive with other DX2-50 notes.

Dell achieves its record-setting battery life with a lithium ion battery. The XP also comes with a DX4-75 or DX4-100 CPU, RAM is expandable to 36MB, and a 524MB hard disk is another option.

Dell has also introduced an entry-level line of notebooks, dubbed simply Latitude, in 486SX-33 and DX2-50 speeds. These systems lack the comfortable palmrest of the XPs and rely on traditional nickel–metal-hydride batteries; not surprisingly, battery life was under 3 hours for a DX2-50 with power management disabled. Standard RAM is 4MB, expandable to 20MB. Prices for a dual-scan passive color model with a 200MB hard drive start under $2000—a bargain for this class of notebook.

The Latitude lines prove Dell is making a serious reentry into the notebook market. They're sure to earn spots on the *PC World* Top 20. Dell Computer Corp., 800/613-3355. Reader service no. 626

Does Microsoft Have a Safer Way to Type?

TEST DRIVE

"Warning! Continuous use of a keyboard may cause repetitive stress injuries."

So reads the warning label included with Microsoft's new Natural Keyboard, the latest in a series of ergonomic keyboards to hit the market in the last year as PC vendors respond to the growing concern among users about repetitive-stress (also called repetitive-strain) injuries. No direct links have been made between keyboard use and problems such as tendinitis or carpal tunnel syndrome, but many specialists think that long hours at the keyboard increase the likelihood of sustaining such injuries.

WARNING

Continuous use of a keyboard may cause Repetitive Stress Injuries or related injuries. See Online Help or the Microsoft Natural Keyboard User's Guide for instructions on using the Wrist Leveler and for important information to reduce your risk of injury. If you feel any aching, numbing, or tingling in your arms, wrists, or hands, consult a qualified health professional.

Microsoft goes beyond just issuing warnings about spending too much time at the keyboard. It includes an online ergonomics guide that covers topics from workstation setup to exercises designed to relieve the tension associated with sitting at a computer keyboard.

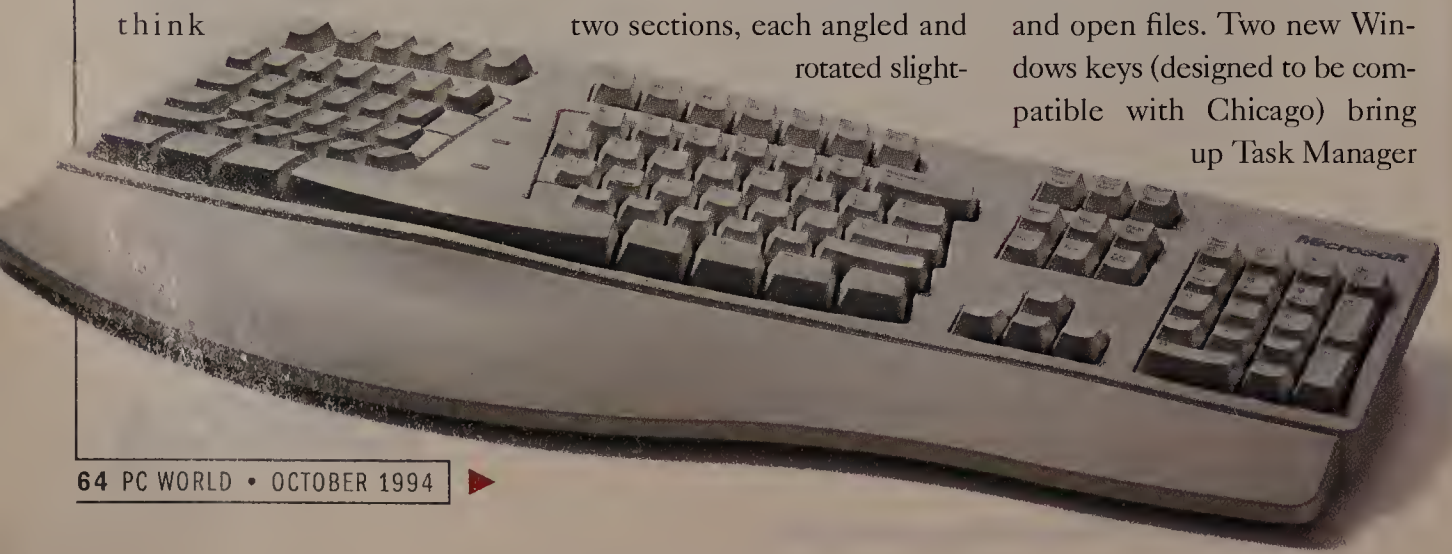
The Natural Keyboard maintains the basic QWERTY layout but splits the keyboard into two sections, each angled and rotated slightly outward, so your palms turn inward when you type. A built-in palmrest with a rail underneath lets you adjust the height of the front edge of the keyboard, to keep your hands from angling above the wrist—a feature also found on the MyKey keyboard from Ergonomixx.

It took me about a week to get used to the new design—and I still find myself reaching over now and then with one hand to tap a key on the "other side" of the keyboard. The keys themselves have a good, responsive feel—not too mushy, but no annoying click, either.

Microsoft has added keys to the design, making it easier to navigate Windows, launch apps, and open files. Two new Windows keys (designed to be compatible with Chicago) bring up Task Manager and allow users to program function keys. Future applications will be able to use a third key to add functions, similar to the way many apps currently use the right mouse button.

As impressive as many of the design features are, it's the price that's likely to attract many PC users. The Natural Keyboard is slated to sell for $99—cheaper than its competitors. It doesn't offer the adjustability of designs from Lexmark, Key Tronic, and others, but it's a good compromise for people who want more comfort without radical change.

—Roberta Furger



JOHN GREENLEIGH

Natural Keyboard

Greater typing comfort in an evolutionary design.

Key Features: Ergonomic design • Windows-specific keys • Built-in palmrest.

Pricing: $99

Availability: Immediate

Microsoft, 800/426-9400

Reader service no. 627

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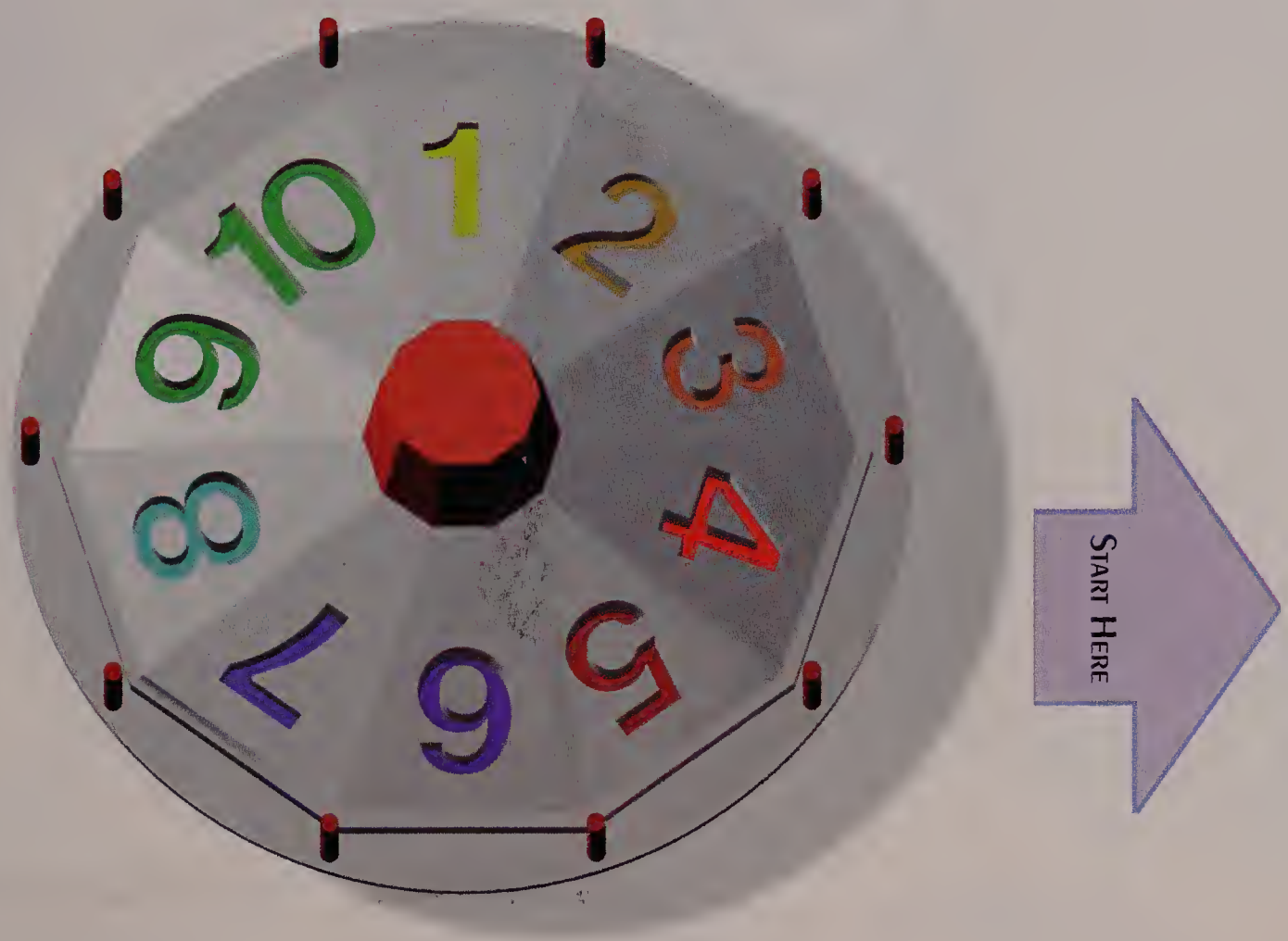
Playing to Win With Quantex



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You got hoodwinked a fly-by-night computer company.

Back 2 spaces

Quantex is the company with a heart.

Ahead 2 spaces

You get stuck with a unresponsive company.

Back 2 spaces

You are drawn in by an overrated, blowhard brand and paid more for less.

Back 3 spaces

Ahead 2 spaces

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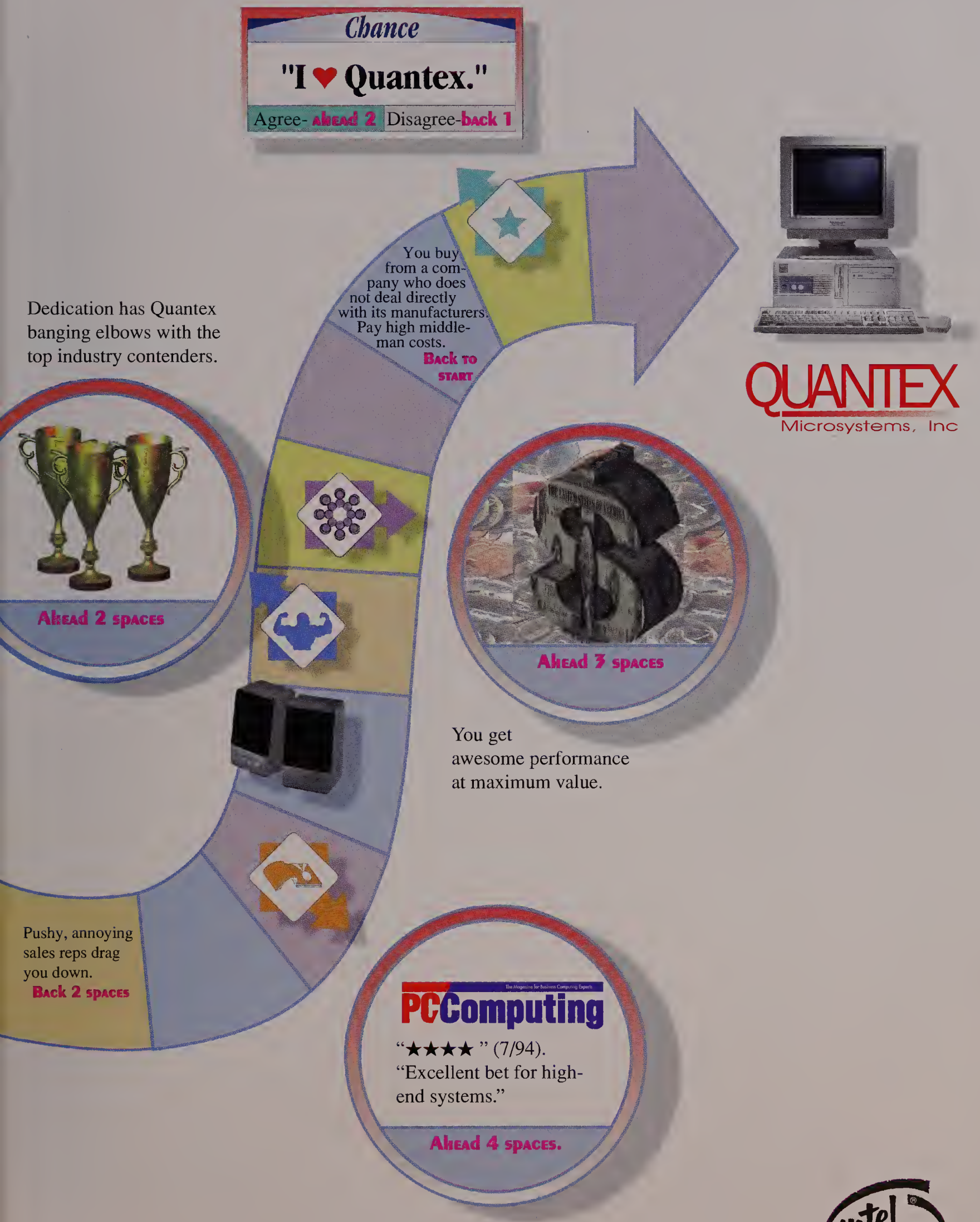
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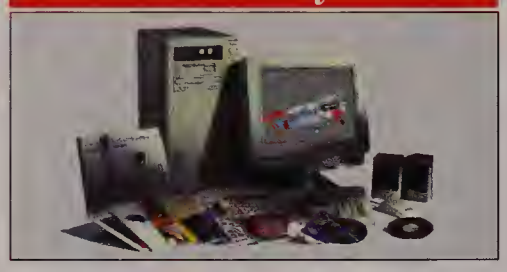
WINNING PACKAGES!

Multimedia Systems



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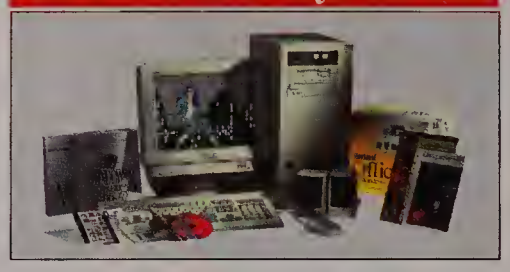
Multimedia Systems



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- 11-Bay Mid-Tower Case
- 101-Key enhanced keyboard & Mouse
- 14,400 Baud Fax/Modem w/software
- Double-spin Multisession CD-ROM Drive
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It's Stop and Go on the Internet

From Capitol Hill to Silicon Valley, construction of the infobahn got under way this summer as Congress took action on telecommunications reform, and software developers moved to make Internet access easier. Here's a summary of recent developments:

- In Washington, D.C., a tug-of-war between special-interest groups threatened to scuttle a plan to reform the regulations governing telephone, cable, and media operations. The legislation would allow these firms to compete in each other's markets. By opening markets—for example, letting phone companies provide cable services—Congress and the Clinton administration hope to provide incentives for these firms to build a national digital communications web that in turn will foster the development of the information superhighway.
- Two House bills to this effect passed in June, but a Senate version stalled in committee until a compromise was struck in August with the regional Bell companies.
- Senate Bill 1822, as approved by the Senate Committee on Commerce, Science, and Transportation, requires the Baby Bells to offer their competitors open, equitable access to all aspects of local phone service. In return, the Bells will be able to enter the markets for video, audio, cable, mobile radio, paging, and information services.

Answering demands from public interest groups, the Senate bill requires all service providers to contribute to a fund to ensure universal access. Final Senate action is expected in September.

Meanwhile, software developers are on the move to bring the next generation of network navigation tools to market. Among the best:

- *Internet Chameleon.* Netmanage, the leader in Windows-based Internet navigation tools based on TCP/IP (Transmission Control Protocol/Internet Protocol), has released this special Internet version of its networking product and has slashed the price from $495 to $195. *Netmanage, 408/973-7171. Reader service no. 628*
- *Eudora.* The most popular freeware mail tool on the Internet now comes in a $65 commercial Windows version. Smart filtering makes handling E-mail a snap. *Qualcomm, 800/238-3672. Reader service no. 629*

—Joe Abernathy

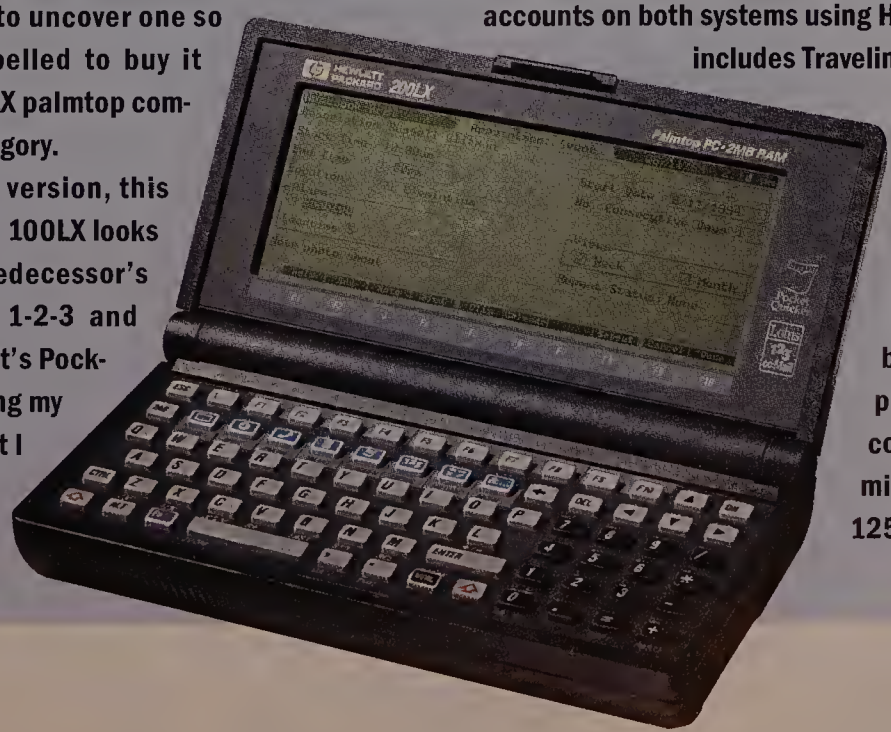
Crosstown Traffic

It's been a busy summer out there on the infobahn:
A legislative step forward: In June, the House passes Bills 3636 and 3626, legislation that permits the cable and telecommunications industries to actively compete in each other's markets.
... And a step back: Senate Bill 1822, the companion to the House bills, bogs down amid intense lobbying from the regional Bells.
Privacy: Ceding to popular outcry, the Clinton administration scuttles Clipper encryption scheme for computer-based applications.
A problem with capacity: In late July, MCI Mail's gateway to the net overflows, bouncing undelivered E-mail in every direction.
... And a possible solution: In July, Bell Labs scientists demonstrate an experimental, 16-lane "information highway" capable of transmitting ten times as much data as today's fastest networks.
Agreement: The Senate Commerce Committee resolves differences with the Baby Bells, and the legislation is positioned for passage.

Addictive Computing:

Some people call my office the toy room. Not because it's small—it is—but because its chockablock with the latest hardware and software, boxes, and stray packing popcorn. Many of these toys are exciting enough to share with you in these pages, but it's rare to uncover one so practical and fun I'm compelled to buy it myself. The 11-ounce HP 200LX palmtop computer falls neatly into this category.

Priced at $699 in the 2MB version, this successor to the discontinued 100LX looks the same but builds on its predecessor's DOS software ensemble of 1-2-3 and cc:Mail Mobile by adding Intuit's Pocket Quicken. I've been balancing my checkbook for years, so at first I didn't see the advantage. But I found there's a practical side to digitizing your debits: I get an at-a-glance accounting of my spending habits. And since I tally those charges on the spot, I can hold spending sprees in check. Pocket Quicken offers the basic features of the desktop version. If you have Quicken on your desktop, you can balance your accounts on both systems using HP's connectivity pack, which now includes Traveling Software's LapLink Remote.



I travel a lot and sometimes simply need to use the modem. So I just slap my PCMCIA fax-modem into the 200LX's Type II slot, and E-mail with ease.

I still prefer the roomier keyboard layout on the Psion Series 3 palmtop—but it wouldn't be mobile computing without some compromises. Hewlett-Packard, 800/443-1254. Reader service no. 630

—Russell Glitman

LEFT: JOHN GREENLEIGH; ABOVE: JEFF BERLIN

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Microsoft Settles: Business as Usual

Now that Microsoft's licensing agreements for MS-DOS and Windows have been deemed "unfair" and "monopolistic" by the Department of Justice, will other operating systems have a fighting chance on the desktop?

According to computer manufacturers, industry analysts, and end users, the outlook is grim for Novell's DOS and IBM's PC-DOS and OS/2. They say there's not much motivation for PC manufacturers to preinstall a competing product, since Windows has millions of users and thousands of software applications. And since Microsoft's upcoming version of Windows (code-named Chicago) won't require DOS, the demand for all flavors of DOS is likely to plummet.

Has the train for Chicago already left the station? "I think the world of OS/2," says Jerry Williams, vice president of data operations for Eglin Federal Credit Union in Fort Walton Beach, Florida. "It's a good operating system. However, I think the momentum has swung in Windows' favor. If you go with OS/2, you're kind of stepping off the ladder."

"DOS is starting to go away, and Windows is taking over everything," says Gary Shurman, president of the New Orleans Personal Computer Club. "Unless somebody comes up with something earth-shattering, I don't think there's a serious challenger to Microsoft."

Despite the skepticism, Microsoft's competitors may have their best chance in years to challenge Bill Gates's desktop domination. After a lengthy investigation by the U.S. Department of Justice and the European Commission (the executive body that governs the European Community), Justice Department officials announced in July that Microsoft had agreed to end its "illegal monopolistic practices" and stop using "unfair contracts that choked off competition and preserved its monopoly" in the PC operating system market.

Terms of the Decree

Under the terms of the consent decree, Microsoft must change its licensing contracts with PC manufacturers (called OEMs). It can no longer make "per processor" agreements that require OEMs to pay a royalty to Microsoft for each PC shipped—regardless of whether the preinstalled operating system is from Microsoft or a competitor. The company also can't require OEMs to purchase a minimum number of Microsoft operating systems or sign a license with terms longer than one year (although the OEM can renew the license for an additional year).

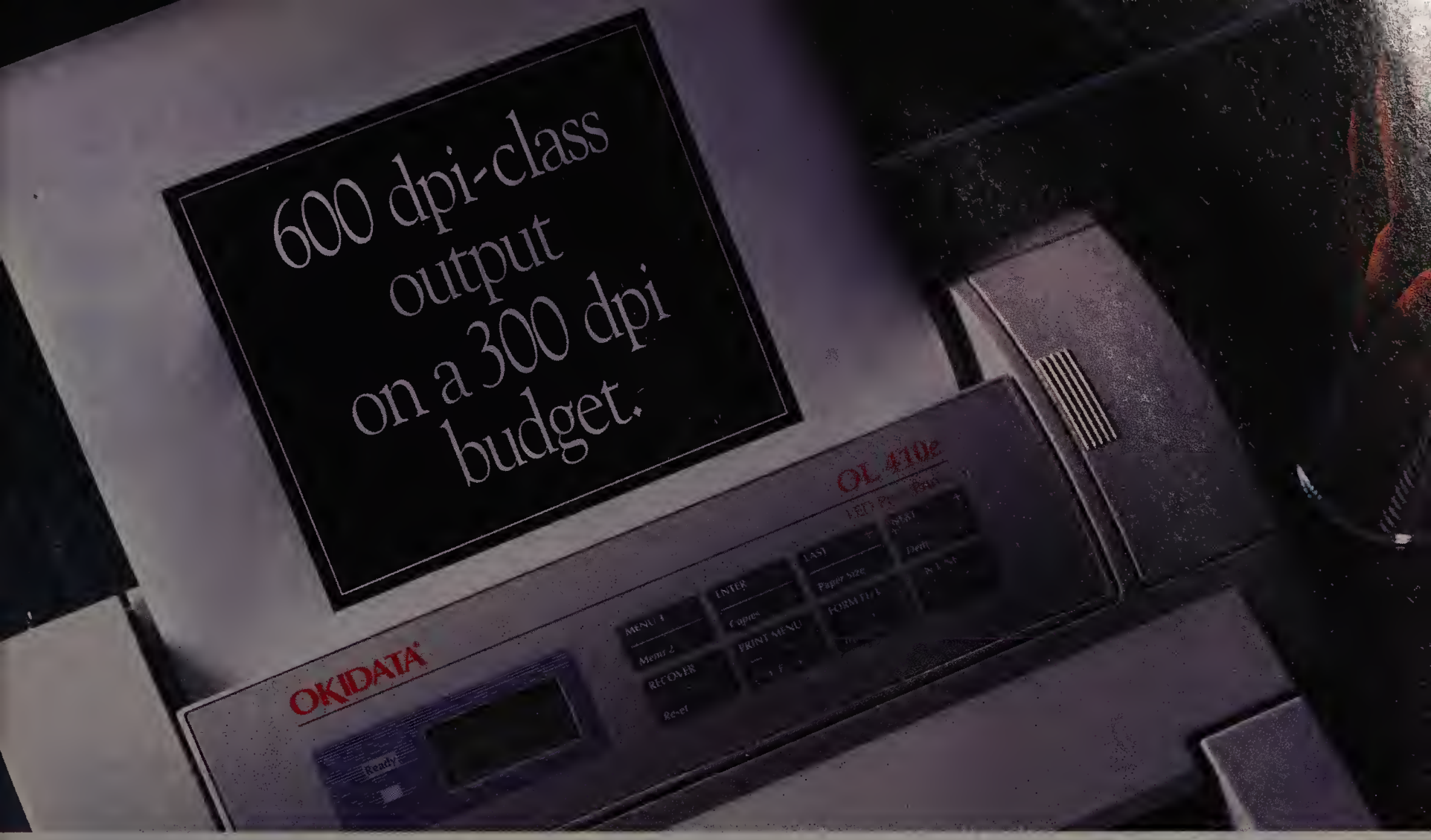
Perhaps most optimistic about the Justice Department ruling is IBM, which has had little success in convincing OEMs to preinstall its OS/2 operating system. "This has really opened the door. We've gone out proactively, contacting hundreds of PC manufacturers already," says John Soyring, a director of IBM's Personal Software Products division in Austin, Texas. While Soyring expects some "major North American manufacturers" to preinstall OS/2, so far Big Blue's victories have been in Europe. Soyring says that German PC makers Vobis and Escom already preinstall OS/2—and Escom expects to ship 440,000 systems with OS/2 over the next 12 months.

Despite the ruling from Justice, Microsoft's influence over PC manufacturers remains immense. Most of the leading OEMs contacted for this article had little or no comment on the Justice Department ruling, other than to say that their relationship with Microsoft would stay the same (in other words, they'd still preinstall Windows). And many industry pundits see the consent decree as a weak slap on Microsoft's wrist. "I think Microsoft is thrilled with the settlement," says Tim Bajarin, president of Creative Strategies in San Jose, California. Of course, if Microsoft is too aggressive, it is likely to find itself in the sights of regulators once again. That's a position even Bill Gates wants to avoid.

—Jeff Bertolucci

New Orleans PC Club president Gary Shurman believes Windows is unstoppable.

RIGHT: DAVID SPEILMAN; ABOVE: JEFF BERLIN



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Hardware 75 | Software 82 | CD Titles 92 | Connectivity 106 | Quick Takes 112

Combo Mania: All-in-One PCs From Packard Bell, AST

Until now, most desktop PCs had as much aesthetic appeal as my dad's brown Oldsmobile. But buckle up—that's about to change. AST Research and Packard Bell have just introduced the first multimedia PCs to integrate a monitor and CPU into a single unit. They've designed these sleek PCs to suit your computing and entertainment needs—and to look good in your home.

Like Compaq's all-in-one Presario systems, Packard Bell's Spectria and AST's Advantage Adventure systems integrate a 14-inch monitor and a CPU into one case. Also like the Presarios, these PCs include 14.4-kilobits-per-second (kbps) fax-modems, with telephone-answering capabilities that equip the systems for voice mail. But the AST and Packard Bell models provide some hip additions, such as CD-ROM drives, 16-bit sound cards, and integrated speakers.

PACKARD BELL SPECTRIAS COMBINE MULTIMEDIA COMPONENTS with a PC designed to look good at home.

Packard Bell also offers an optional TV tuner and accent panels in teal, azure, or sahara, so you can match the PC to any room decor. Estimated street prices for the Packard Bell systems range from $1599 to $2599; for the AST models, from $1799 to $1999.

These PCs give novice and home users the advantages of easy setup and space-saving design, plus bundled software and CD-ROM titles. They do have one limitation, however: You can't upgrade your monitor.

Tune Into the Spectria

The main differences between the AST and Packard Bell systems are looks, bundled software, and home entertainment features. Packard Bell's Spectrias look modern and sophisticated, with a curved design and speakers on the sides of the monitor. Turn on the Spectrias and you're flying through Navigator 2.0, a PC tutor and Windows shell that groups files and certain applications into graphical "rooms." For example, you can select the Learning Center for tutorials or the Workspace to organize files.

The Spectria systems boast two unique entertainment-oriented features. First, these PCs can receive FM stereo, thanks to an FM tuner on the sound board. (You must connect an included antenna to the back of the sound card to enable this feature.) Also, an optional TV/video card lets you view an incoming video signal from a VCR, a laser disk player, or cable and broadcast TV. The card plays video clips, but it captures only still frames. The TV card costs approximately $200.

AST'S SLEEK ADVANTAGE ADVENTURE SYSTEMS OFFER both multimedia and online capabilities in an all-in-one design.

The Spectrias come with your choice of 486 processor. They include 4MB or 8MB of RAM. At press time, Packard Bell had not set hard drive sizes, but the company said sizes would start at 340MB.

AST's All-in-One

AST's Advantage Adventure PCs look a bit more minimalist, with neatly designed speakers along the sides of the CPU chassis rather than the winglike speakers that are attached to the Packard Bell Spectria monitors. AST also provides easy setup and its own answer to Packard Bell's Navigator: AST Works. This program acts as a Windows shell and gives online help in the form of PC-based video clips. In these clips, AST employees answer some commonly asked questions about setup and PCs in general.

AST offers two models of the Advantage Adventure: The 4050d has a 486DX2-50 processor, a 420MB hard drive, and 4MB of RAM. AST estimates this model will sell for $1799. The $1999 4066d comes with a 486DX2-66 processor, 8MB of RAM, and a 420MB hard drive.

—Laurianne McLaughlin

Spectria

MULTIMEDIA **Multimedia PCs with FM tuner, optional TV/video card.**

Packard Bell
800/733-5858, 818/865-1555
Estimated street price: $1599–$2599
Reader service no. 821

AST Advantage Adventure 4000 Series

MULTIMEDIA **Clean design and good software bundle.**

AST Research Inc.
800/876-4278, 714/727-4141
Estimated street price: $1799–$1999
Reader service no. 822

Canon, Lexmark Set New Pace for Ink Jet Printers

Two new color ink jet printers from Canon and Lexmark stand out from the pack. Canon's BJC-4000 prints faster than any ink jet in its price range, while Lexmark's ExecJet IIc provides above-average quality in a low-price printer.

While most ink jets print monochrome pages at what I consider a crawl, this Canon sprints. The BJC-4000 cranks out letter quality black-and-white documents at a rated speed of 5 pages per minute (ppm). Until now, the standard for this price range was 3 ppm; for faster speeds, you had to move up to the 6-ppm HP DeskJet 1200c, which has 600-by-300-dpi resolution—and a $1425 street price. Canon expects the BJC-4000 to sell for about $499 on the street.

In testing, the Canon produced impressive output. With 720-by-360-dpi resolution in monochrome, the printer produced crisp business letters and good-looking newsletter pages. The quality of ink jet print doesn't match laser quality exactly, but the output from the BJC-4000 looks fine for important documents.

The BJC-4000 prints color documents at a speed of about one-third page per minute. That's not fast, but no other ink jet in this price range offers significantly better speed.

At 360 by 360 dpi, the BJC-4000 is not the highest-resolution color ink jet printer available. Epson's Stylus Color ($550 to $599 street price) offers 720-by-720-dpi resolution on specially coated paper, and HP's DeskJet 560C ($569 street price) does 600 by 300 dpi. However, the test results from the Canon impressed me. I got the best output using coated paper, but plain paper worked pretty well, too. In a test newsletter page with a color graphic, the graphic looked perfect. I found a few minor fuzzy spots in the text, but they were hardly noticeable.

If price rather than speed is your priority, check out Lexmark's new ExecJet IIc. With an estimated street price of $350, this ink jet printer makes a good choice for a small or home office on a tight budget. This model, in both monochrome and color modes, delivers print quality far superior to that of some low-cost ink jets.

The ExecJet IIc prints at a rated speed of about two to three monochrome pages per minute at 600-by-300-dpi resolution using PQET, Lexmark's graphics-smoothing technology. I found its output hard to distinguish from the Canon's in monochrome. The ExecJet IIc offers 300-by-300-dpi color resolution. When I printed a newsletter page containing a colored graphic on coated paper, the results were more than adequate. On color pages, the more expensive Canon BJC-4000 produced only slightly sharper text.

—Laurianne McLaughlin

CANON'S BJC-4000 INK JET offers fast 5-ppm printing in monochrome mode.

Canon BJC-4000

Ink jet with breakthrough 5 ppm in monochrome, plus good-looking color.
Canon Computer Systems
800/848-4123, 714/438-3000
Estimated street price: $499
Reader service no. 823

Lexmark ExecJet IIc

Above-average quality for a low-cost ink jet.
Lexmark Int'l
800/358-5835, 606/232-2000
Estimated street price: $350
Reader service no. 824

Toshiba's Quad-Speed CD-ROM

Serious multimedia requires serious hardware. That's why quadruple-speed CD-ROM drives that deliver data at 600 kilobytes per second (K/sec) are becoming the performance standard. Toshiba's CD-ROM drives have a well-deserved reputation for top quality at a fair price. But the new quad-speed Toshiba XM-3501 is a surprise, full of cutting-edge technology coupled with a surprisingly low price ($470 for an internal unit, $600 for the external version).

All quad-speed drives deliver continuous data at exactly the same rate, but many other factors determine performance. For instance, many manufacturers play fast and loose with average access speed. But Toshiba goes into excruciating detail about how it measures access speed and what the term means. The bottom line is that the XM-3501 could be one of the fastest CD-ROM drives around, with an average access speed of 155 milliseconds, according to the vendor.

Also unique to the new Toshiba drive is a 256K read-ahead cache buffer. Competing units have caches, but they don't read ahead to anticipate what data will be needed next. This capability can make a dramatic difference if you use your CD-ROM drive for video.

The XM-3501 has a standard SCSI-2 interface (SCSI connector kit not included) and a fully sealed drive mechanism that protects it against dust and dirt. If you're serious about multimedia, this drive could set the standard for some time to come.

—Stan Miastkowski

Toshiba XM-3501

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But most importantly, the Contura Aero is an incredibly full-featured and useful working tool. It comes with 4MB RAM, an 8" monochrome backlit VGA display, integrated trackball, preinstalled software and more.

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Circle 98 on reader service card

Upgradable Notebooks and Multimedia to Go

Zenith Data Systems (ZDS) has released two portables: an upgradable modular notebook aimed at entry-level users and an add-on device for multimedia and presentations on the road.

The ZDS Z-Star EX notebook is powered by a 50-MHz Cyrix 486DX2 CPU and comes in three screen variations: monochrome, dual-scan color, and active-matrix color. (The monochrome model weighs 5.2 pounds; color units weigh 5 ounces more.) Configurations range from a $1799 monochrome model that includes 4MB of RAM and a 200MB hard drive, to a $3699 unit with an active-matrix color screen, 8MB of RAM, a 340MB drive, and an extra battery.

The Z-Star's easy-to-upgrade modular design lets you upgrade the system as your work demands (or as your budget permits). According to ZDS, you can install a new screen, more RAM, or a larger hard drive; processor upgrades need to be performed by a ZDS technician. Further upgrade options are provided by a PCMCIA Type III slot and a proprietary module that holds either a 16-bit sound card or a modem.

Rather than make you carry a bulky external AC power pack, the Z-Star has an innovative AC adapter that operates either externally or inside the system, where it fits in the battery compartment in place of the NiMH battery. By removing the floppy drive, you can free up a second bay to use either for another battery—so that the computer can run twice as long away from wall outlets—or for the AC adapter.

The Z-Star's pointing device is a refined version of the unique J-Mouse, which turns the keyboard's *j* key into a tiny joystick. The mouse buttons have been moved off the keyboard and onto the system's wrist-rest area.

ZDS's other new portable device is the $499 Z-Player, which crams a double-speed CD-ROM drive and 16-bit audio system into a 2-pound case that's about the size of a subnotebook computer. It's a portable multimedia upgrade that ZDS says should work with most notebooks that have a PCMCIA Type II slot and at least 512K of video RAM.

You can use a notebook equipped with the Z-Player for flashy presentations, business audio, and playback of multimedia CD-ROM titles; front-panel buttons let it play audio CDs, whether or not it's attached to a computer. The Z-Player includes built-in speakers and a microphone, plus jacks for more-powerful external speakers or a handheld microphone. The Z-Player can be powered by an AC adapter, six AA batteries, or an optional nickel-cadmium cell. ZDS estimates that either battery option will provide between 45 minutes and 2 hours of power, depending on the application.

—Harry McCracken

ZDS Z-Star EX and Z-Player

MULTIMEDIA **Modular notebook and portable multimedia playback device.**
Zenith Data Systems
800/533-0331
List prices: Z-Star EX $1799 to $3699, Z-Player $499
Reader service no. 826

POWERFUL PORTABLES: Zenith's new notebook simplifies upgrades; the 2-pound Z-Player offers you multimedia on the go.

Keyboards, Keypads for Portables

If your notebook or subnotebook lacks a port for attaching an external keyboard or keypad, some new products from Alps Electric and Genovation can help.

Alps Electric's $109 Alps LPT-101 keyboard and Genovation's $115 Parallel Keyboard 101 both plug directly into the parallel port of any portable computer. The full-size 3½-pound keyboards use T connectors that let you attach both the keyboard and a printer or other parallel device to the same port.

Though the keyboards are similar in appearance, we found that each one offers a different touch. The Alps LPT-101 has a firmness that seems right for users who prefer a less springy feel. The Genovation, which uses a mechanical key switch technology, has a softer touch—but without the mushy "give" that makes users feel they have no control over the keys.

For users who deal with spreadsheets, accounting software, and other number-heavy tasks, Alps Electric also released two full-size numeric keypads. The Alps KPX-17P (parallel) and KPX-17S (serial) keypads are convenient alternatives for quick input capability. The keypads are priced at $95 each.

—Michael Lasky

Genovation Parallel Keyboard 101, Alps LPT-101, Alps KPX-17P (parallel), Alps KPX-17S (serial)

Full-size keyboards and keypads for notebook PCs.
Genovation Inc.
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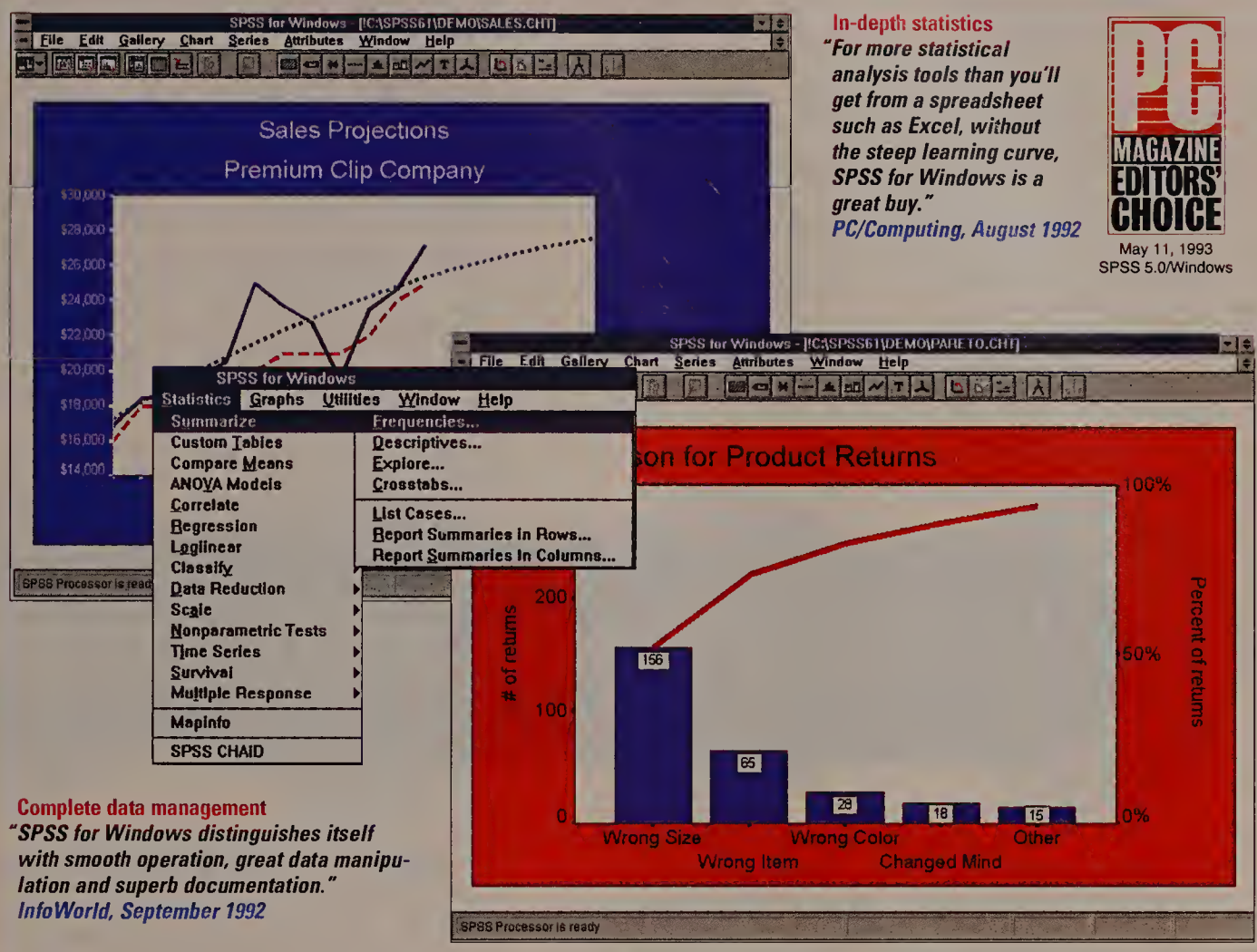

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Advanced Bus Architecture	PCI	VL		
Integrated Networking Interface	32-bit	16-bit		
Integrated, multiprotocol Boot-ROM	X	X		
ISA Plug-n-Play Compliant	X	X	X	
Multilevel Security Features	X	X	X	X
Asset tracking	X	X	X	
PC tattooing	X	X	X	
Optional Desktop Management Software	X	X		
Bi-directional parallel port	X	X	X	X
Desktop Management Interface (DMI)[3]	X	X		

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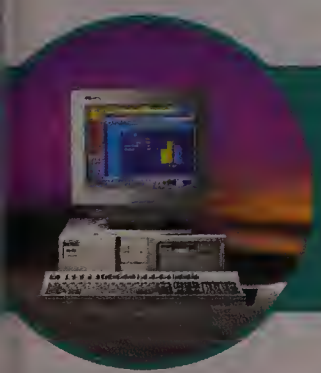

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Aldus FreeHand 4.0: Less Clutter, More Drawing Tools

Aldus FreeHand 4.0 is a powerful draw program whose chief distinction is its superior design. The program's new interface is so logical and compact that at first glance you think it couldn't possibly offer enough features. But as with a well-organized closet, everything's right at your fingertips.

FreeHand is primarily a PostScript draw program (although it can open and edit files in 16 other graphics file formats), so its main competitor is Adobe Illustrator. But while Illustrator's graphing capabilities and plug-in architecture give it a somewhat richer toolbox, it feels like a box full of miscellaneous tools compared with the more neatly integrated FreeHand, which is much easier to learn and use.

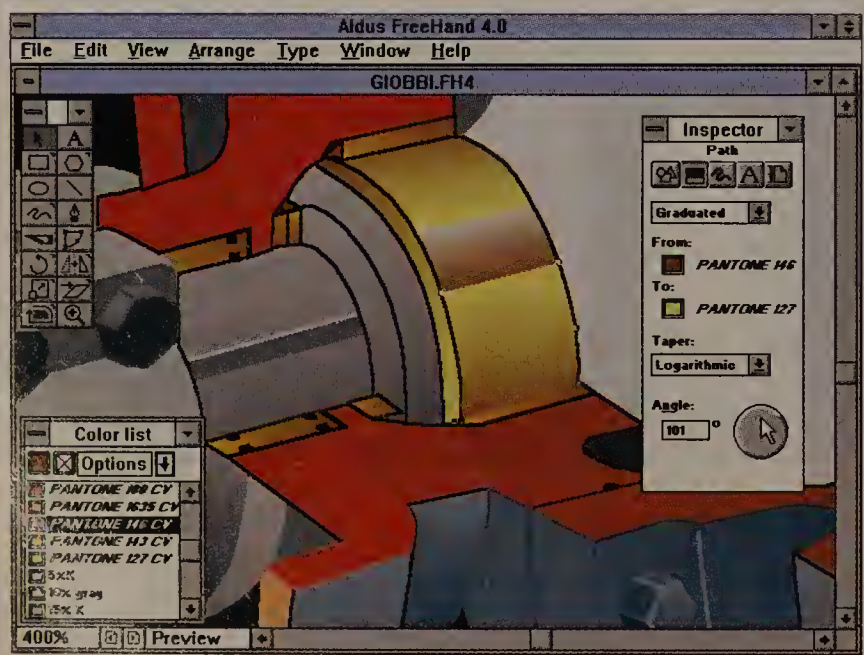
FreeHand's key ease-of-use improvement is the Inspector, a context-sensitive floating control palette that eliminates most trips to the menu bar. The compact Inspector lets you control page and setup variables, including rulers, snap-to distances, and bleeds. Other floating palettes control less-used functions (such as colors, tints, and halftones). Not included, however, is the text palette for controlling fonts, styles, point sizes, and so on, which really should have been built into the Inspector.

FreeHand's interface housecleaning doesn't just mean fewer menus. Even the drawing tools have been simplified: Simply click an icon (while holding the <Shift> or <Alt> key) to access FreeHand's familiar corner, curve, and tangent points. Another new tool creates both regular polygons and multipointed stars. The old text-editing window is a thing of the past; now you can set text directly on the page and create multicolumn text frames. FreeHand 4.0 also lets you use multipage documents—and each page can be a different size.

With version 4.0, FreeHand now handles text better than most (arguably all) page layout programs. It can automatically balance or vertically justify columns by modifying *leading* (the distance between character baselines from one line of type to the next). It can link frames so that text flows from one frame to another. It lets you control the depth of the text's ragged margin. And it allows you to control word spacing and letterspacing in any text selection, not just whole paragraphs. For the typographically demanding, there is no better draw program than FreeHand.

A program's manual is also part of its interface, and FreeHand's is one of the clearest and most helpful you'll find anywhere. Using more pictures than words, it's a model of good information design. If you've never used a draw program before, you'll find FreeHand more comprehensible than the rest. And even if you're a veteran of another program, FreeHand 4.0's superior design and powerful tools can quickly make you forget your past loyalties.

—James Felici



ON-SCREEN EDITING TOOLS: Aldus FreeHand 4.0's toolbox and Inspector palette help free you from a lot of menus and dialog boxes.

FreeHand 4.0 for Windows

Superior draw program with a well-designed interface and powerful features.
Aldus Corp.
800/685-3540
List price: $595
Reader service no. 817

Payroll at Your Fingertips

Sure, it's your job. But very few managers savor the thought of calculating the company payroll, due to complicated tax structures, intimidating numbers and, yes, boredom. But CheckMark Payroll's cute icons, intuitive menu choices, and comprehensive windows make this tedious task less laborious. Plus, the product's reasonable $129 list price puts it within easy reach of small businesses.

Previously available only for the Macintosh, CheckMark Payroll for Windows works either as a stand-alone payroll program or as an add-on to accounting programs such as Peachtree Accounting for Windows, MYOB, and Quicken. To get started, you enter typical tax information and set the parameters that determine your payroll. This is where CheckMark's flexibility comes in handy. When entering information such as your business's hours, pay scales, and miscellaneous deductions, you can either use predetermined fields or create new ones.

CheckMark makes paying your employees as painless as possible, too. Setting up employee wage forms is remarkably easy. Once you've entered your employees' vital statistics, you can enter their hours in a spreadsheet-style window. CheckMark calculates federal, state, and local tax withholding amounts, as well as social security deductions.

—Caroline Jones

CheckMark Payroll for Windows

Simplifies figuring the company payroll.
CheckMark Software, Inc.
800/444-9922, 303/225-0522
List price: $129
Reader service no. 818

Shopping Around For A $500 15" Flat Square Color Monitor? Check Us Out.

Required Features	Mitsubishi Diamond Pro® 15FS	Other Leading 15" Flat Square Model
High Refresh 1024 x 768 Non-Interlaced Resolution	✓	☐
Auto Calibration	✓	☐
Microprocessor-Based Auto-Scanning	✓	☐
Color Calibration System	✓	☐
Digital User Controls	✓	☐
On-Screen User Controls	✓	☐
Compact, Lightweight Design	✓	☐
Dark Tinted, Optical Quality Anti-Static, Anti-Glare Screen	✓	☐
Wide 100 MHz Video Bandwidth	✓	☐
Screen Safety Display	✓	☐
$500 Street Price (Approximately)	✓	✓

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For immediate product specifications, call Mitsubishi Qwikfax at 1-800-937-2094.

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Circle 188 on reader service card

If the cost of high performance notebooks has kept you grounded...

The value of a great notebook.

If you think a top quality notebook has to come with a sky-high pricetag, take a look at the AcerNote.™ It delivers first-class features for economy class prices. Get blazing processor speed, crisp active-matrix color and AcerNote's innovative SmartCase™ design, which lets you open the case and install drives, memory—whatever features you need most. A one-year International Travelers Warranty and 24-hour replacement policy completes the value picture. Don't delay another minute on a notebook purchase—land an AcerNote notebook today.

ACER COMPUTERS • THE INDUSTRY SOURCE

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NOTEBOOK COMPARISON

	AcerNote 780cx	Toshiba T4800CT
astest CPU Available:	iDX4/75	iDX4/75
Veight:	6.4 lbs.	6.9 lbs.
attery Life:	NiMH/3 hrs. max	NiMH/2.5 hrs. max
nput Device:	Built-in trackball	Clip-on trackball
CMCIA:	2 Type II or 1 Type III	1 Type II or Type III
ost:	Over $1,500 less	

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AcerXpress Fax Back System: 1-800-554-2494 Acer BBS: 1-408-428-0140

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Circle 102 on reader service card

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or a 90MHz Pentium Processor AcerPower.

MINITOWER COMPARISON

	AcerPower Pentium Processor Minitower	AST Bravo MT
astest CPU Available:	Pentium 90MHz	Pentium 60MHz
4-Bit Local Bus Graphics:	Yes	No
CI Expansion Slots:	Yes	No
otal Storage Bays:	7	6

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Circle 102 on reader service card

Visio 3.0 Simplifies Business Charts and Drawings

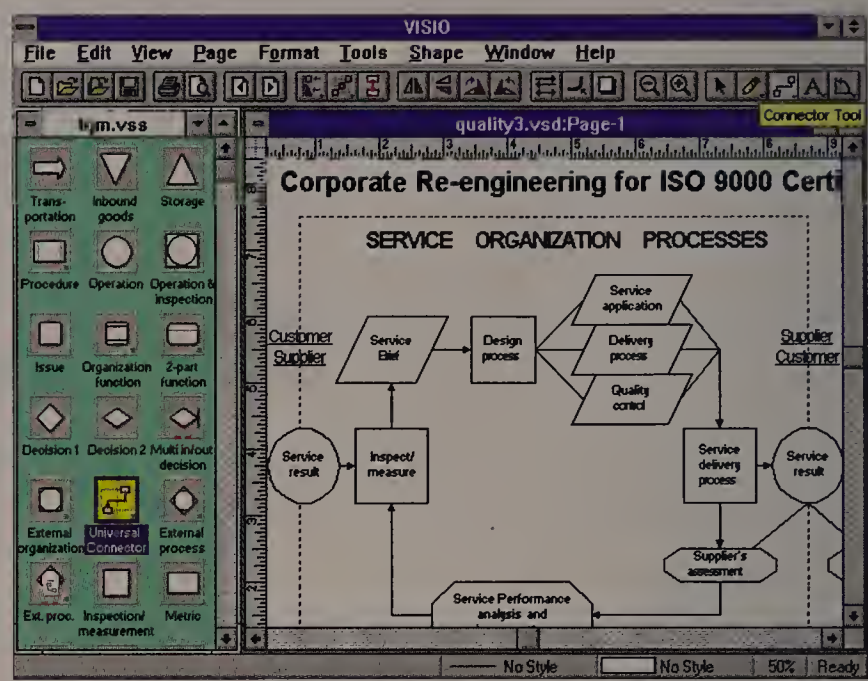
Shapeware Corporation's Visio 3.0 boasts a suite of new features and usability improvements, making it a worthy business tool for those needing to create flowcharts, organization charts, decision trees, and floor plans.

Visio has always made it easy to drag predefined shapes onto a worksheet, but establishing the right connections between shapes has sometimes been tricky. Version 3.0's new Connector tool automatically selects the best connection points between objects and determines whether the line between them should be straight or angled (based on the relationship between the two objects). Activate the Connector tool from the tool bar, drag two shapes onto your worksheet, and the Connector intelligently connects them as you sit back and watch.

Visio 3.0 has lots of small improvements, too. You can now customize the menu bar to mimic those in Microsoft Office and Lotus SmartSuite. You can also double-click on any shape to open an embedded worksheet that supplies additional information. Let's say you're creating an organization chart of senior management. Instead of cluttering the master sheet with a hierarchy of all the managers' departments, just double-click on a manager's object to view that department's organization tree. Visio now includes a print preview mode, too.

Shapeware claims that Visio 3.0 runs faster than previous versions and that the program's charts and drawings have smaller file sizes than those created by earlier versions. However, Visio itself takes up a sizable 13MB to 15MB of disk space when fully installed. Two new groups of shapes—one for quality control, the other for international flags—brings the total number of shapes to about 750. Visio 3.0 has a street price of $129. Upgrades list for $69.

—Anita Hamilton



CREATE ORGANIZATION CHARTS WITH VISIO 3.0: The Universal Connector tool selects the best connection points between objects.

Visio 3.0

Creates flowcharts and other business graphics.
Shapeware Corp.
800/446-3335
List price: $199
Reader service no. 811

Billing and Time Tracking by the Hour

If you manage an operation that bills customers by the hour, your time-tracking and billing needs haven't been addressed much by software publishers. TimeSheet Professional 3.0 for Windows redresses that grievance. It's a helpful tool for a contracting business or a professional practice such as a law or architecture office.

Built on a spreadsheet metaphor, this electronic time sheet lets you attack the project-billing morass with an intelligent, if sometimes quirky, interface. You can run TimeSheet Professional either as a centralized stand-alone program, with one person entering data for everyone, or as a networked system with individual users tracking their own billing and expenses. Either way, it's easy to enter data for an individual or a project, and you can attach expense information and notes to the data. TimeSheet Professional supports most networks, including NetWare, Banyan's VINES, LANtastic, and Windows for Workgroups.

TimeSheet Pro doesn't restrict you to specific terminology, letting you customize the program's vocabulary. For instance, a law office can change the term *employee* to *attorney*, or *project* to *case*. TimeSheet Pro is flexible in other ways, too: Small businesses aren't encumbered by the tedious setup procedures required by many accounting packages.

Of course, easy data entry is useless unless the data itself is useful. Since TimeSheet Pro exports data to popular spreadsheet and project management programs, your timekeeping records can reside with your projected-versus-actual financial analysis data.

The program also produces customizable reports in two flavors: Summary (totals, by project, over a fixed time) and Detail (time and expenses, with notations, for specified individuals on specified projects). These reports provide all the invoicing capability that many organizations will ever need.

The interface is still one revision away from offering true ease of use. For instance, customizing reports can be a confusing chore. But TimeSheet Pro's effective design simplifies the basic features. If you want better project-billing and tracking tools, take a close look at TimeSheet Professional.

—Jeffrey Gordon Angus

TimeSheet Professional 3.0 for Windows

Tracks multiple employees' time and expenses by project.
TimeSlips Corp.
800/285-0999
List price: single-user version $199.95, eight-user network version $699.95
Reader service no. 812

WE'VE DECIDED TO ADD A FEW CHOICE PIECES TO THE PUZZLE.

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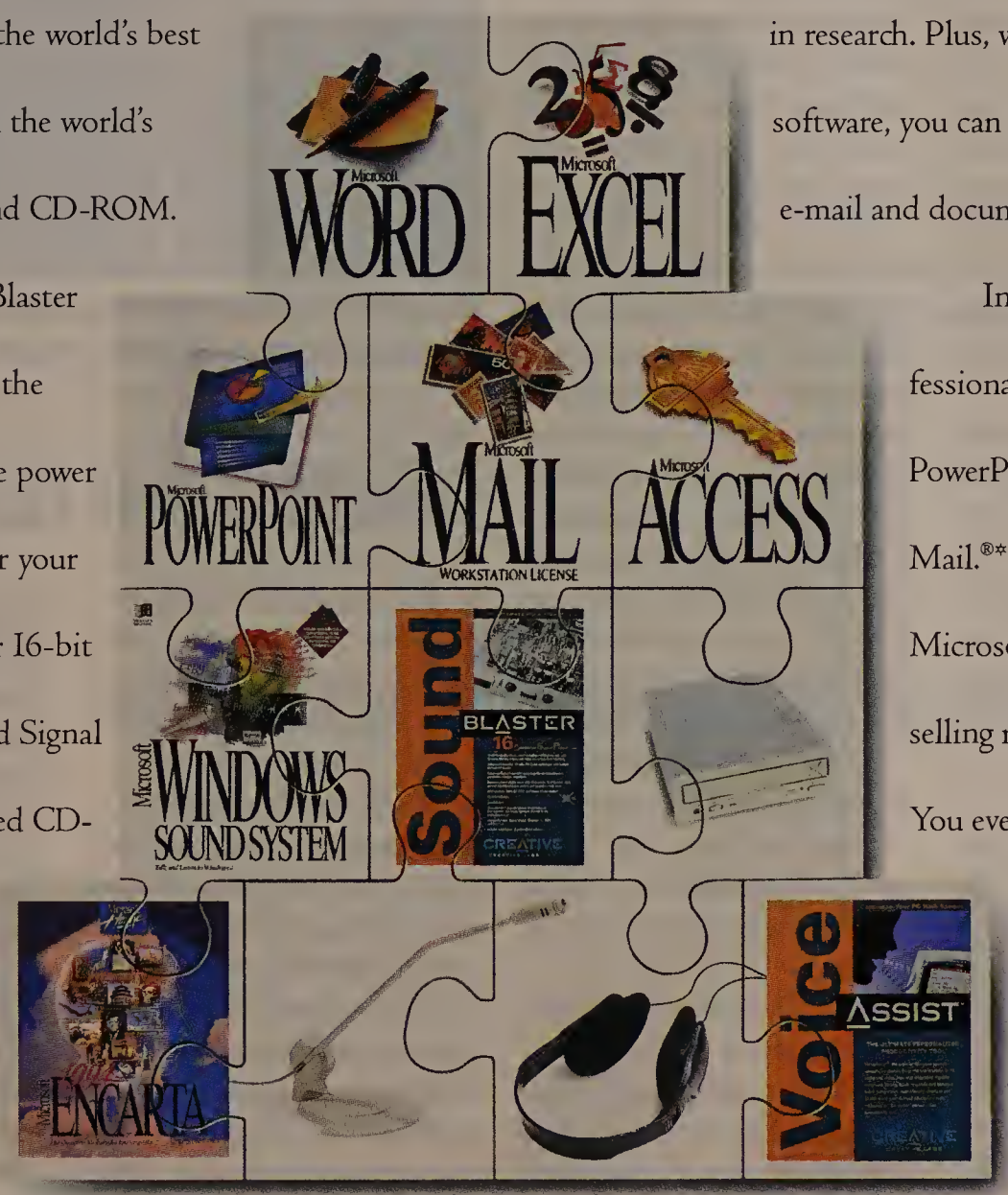
How do you improve on the world's best business software? Add in the world's best-selling sound card and CD-ROM.

It's the new Sound Blaster Multimedia Office™*—all the pieces you need to put the power of multimedia to work for your business. A Sound Blaster 16-bit sound card with Advanced Signal Processing. A double-speed CD-ROM. And Microsoft® Office Professional version 4.3—the ultimate Windows™ business software. It's how multimedia really gets down to business.



What's more, you also get a microphone, headphones and Creative VoiceAssist™ software. So you can navigate your way through Windows applications using voice commands. And with a CD-ROM, you can reference titles for easy use in research. Plus, with Creative TextAssist™ software, you can have your spreadsheets, e-mail and documents read back to you.

In Microsoft Office Professional, you get Excel,® Word,® PowerPoint,® Access,® and Mail.®** In addition, you get Microsoft Encarta®—the best-selling multimedia encyclopedia. You even get an office training system on CD-ROM. Now you can make a prudent business decision and get some cool stuff. Sound interesting? Just visit your nearest Creative Labs dealer. Or call 1-800-998-5227, ext. 101.

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Circle 54 on reader service card

dBASE 5.0 for DOS: More Than Just a Prettier Interface

With the release of version 5.0, Borland has finally brought dBASE for DOS into the nineties. The first thing I noticed about the new dBASE interface was its similarity to FoxPro's. The program's new Developer's Desktop interface features a Command Window and Windows-style menus with familiar choices such as File, Edit, and Window. The Command Window, which replaces the old dot prompt, enables you to reexecute commands by double-clicking them; and you can cut and paste between the Command Window and other programs.

Version 5.0 is fully compatible with older dBASE versions and runs programs created with dBASE III Plus and dBASE IV. If you prefer the program's old look and feel, you can switch from the new Developer's Desktop to dBASE IV's Control Center interface. But give the new look a chance: Developer's Desktop offers plenty of features for both programmers and end users. The new Form Designer features an Object Palette that lets you add push buttons, list boxes, and other items to forms.

And as with Paradox for Windows and dBASE for Windows, you can right-click on objects to open an Object Inspector—a dialog box that lets you change object properties, such as colors and labels, without having to write code. The Form Designer also provides commands for adding table lookups and custom field help. Borland calls the Form Designer a Two-Way-Tool, which means you can rewrite Designer-generated code either by hand or via Designer's dialog boxes and other tools. In addition, the new Menu Designer lets you create custom menus in a form window.

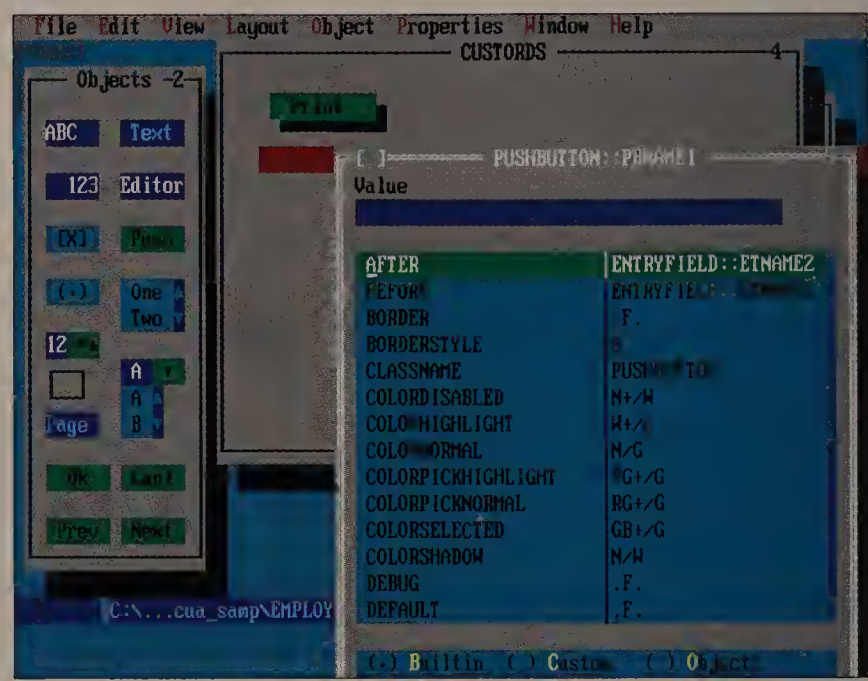
dBASE application developers will appreciate the Project Manager, the compiler, and other tools that make it easier to manage the vast jumble of files that make up an application. With the integrated compiler, you can create and distribute EXE files that run without requiring a run-time version of dBASE. And since Borland has added several object-oriented and event-oriented commands to the dBASE programming language, developers can write applications that are more graphical and easier to use than the old menu-driven dBASE programs.

Although I had hoped to find better tools for creating multitable forms and for setting relationships between data files, version 5.0 is a big improvement over dBASE IV. In addition to its prettier, easier-to-navigate interface, dBASE 5.0 is faster than its predecessors. The program's SpeedFilter technology (also found in dBASE IV 2.0) accelerates tasks involving groups of selected records in data files. dBASE 5.0 also runs in 32-bit mode and uses a virtual memory management scheme, resulting in faster performance for many commands.

—Celeste Robinson

dBASE 5.0 for DOS

Venerable DOS database is now faster and easier to use.
Borland Int'l
800/233-2444, ext. 1212
List price: $795, upgrade $149.95
Reader service no. 813



THE NEW FORM DESIGNER TOOL in dBASE 5.0 for DOS helps you add objects such as fields and push buttons to a form.

Collections Made Easy

Monitoring taxes and profit margins isn't the only headache in a manager's life—collecting overdue debts is often another. Fortunately, the DOS-based debt management program Collections Plus for DOS can simplify this chore.

Collections Plus divides your collection process into phases. To start, you enter client and payment information, including payment histories, outstanding principals, and collection fees. If you already use an accounting program, you can import your existing accounts-receivable data into Collections Plus through a delimited ASCII file.

Once you've imported the client and payment information, you can organize your collection schedule. You create the schedules, and Collections Plus automatically determines when you should follow up with debtors. Collections Plus tracks the payment schedule, and its Flag Tickler System prompts you to follow up on negligent clients. The program can also pop up a reminder when it's time to send another letter or invoice.

Collections Plus supplies you with eight standard collection letters, which you can modify, in English and Spanish. The letters include check requests, a friendly monthly reminder, and legal threats.

Although the package won't put your debtor's check in the mail, it does simplify the collection process. You'll also save time and money that might otherwise be spent on an attorney, a collection agency, or both.

—Arden M. Hoffman

Collections Plus for DOS

Automates debt collection.
Gazelle Systems, Inc.
800/786-3278, 801/377-1288
List price: $249
Reader service no. 814

GEnie for Windows: Road Kill on the Infobahn

If GEnie is "the most fun you can have with your computer on," call the Hemlock Society. We're goners.

After seeing GEnie's flashy new advertising campaign, I couldn't wait to try the online service's hot new Windows navigator, GEnie for Windows. GIFs!, the ads screamed. Chat! A multimedia magazine! GIFs!

But GEnie's new Windows shell is a letdown. It provides a bare, text-based prompt—the kind found on the most primitive online service or bulletin board. You navigate the system by typing page numbers; there are no online viewers for graphics files, no multimedia players for audio clips, and no friendly icons to help you content surf.

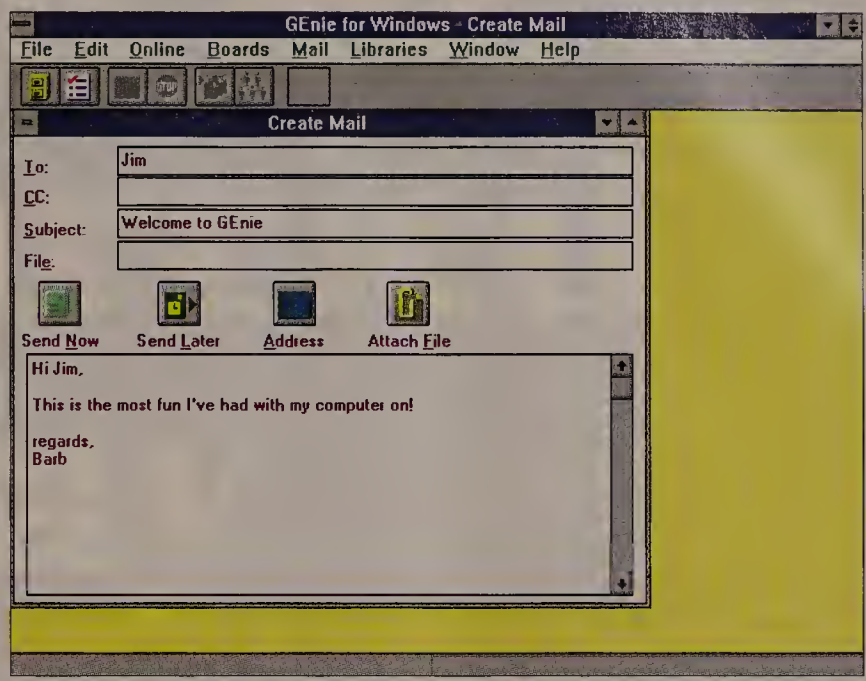
On the positive side, GEnie for Windows does include a chat mode, an acceptable mail tool, and a convenient way of accessing the file library. If you sit idle too long, a window pops up asking permission to end the online session. (I recommend that you say yes.)

My overall response in reviewing this product: Why now? Back when the blush was still on the Reagan administration, GEnie caused a stir with relatively low pricing, but that's about its last significant move.

What's needed in 1994 is not GEnie's primitive Windows interface, but an enriched navigation system based on the principles of expert systems. What's needed is not GEnie's bare Internet mail connection, but full, interactive connectivity offering Internet file transfer, Usenet news, and the full universe of Internet features.

Barring such capabilities, an online service would have to have some very compelling content—which GEnie also lacks. The best reasons to use GEnie are the Charles Schwab Brokerage Service (which offers GEnie subscribers a 10 percent discount on commission fees) and Dow Jones News/Retrieval service. Dun & Bradstreet profiles also are available.

GEnie's Windows navigator is a clear case of too little, too late.



BARE-BONES SHELL: GEnie's new Windows interface could use more graphical features, but its E-mail tool is helpful.

If you want to chat and play games, join America Online. If you want financials, check out Prodigy or CompuServe. And if you want to have the most fun possible with your computer on, get a real Internet account.

—Joe Abernathy

GEnie for Windows

Disappointing Windows interface for online service.
GEnie
800/638-9636,
800/638-8368 (modem)
Pricing: $8.95 monthly for 4 hours, $3 per hour thereafter
Reader service no. 815

Disk Historian Housecleans Your Hard Disk

I've forgotten the names of more software packages than some people will ever install, so I was particularly pleased at the arrival of Disk Historian, a nifty new Windows utility.

Windows has a worse case of creeping bloat than a desk jockey in his 30s. You install software, you uninstall it—but you never get rid of all the little files scattered across your hard disk. My Windows directory currently has 32MB of files. I can't tell you what they all are, but I suspect that some of them are no longer necessary.

One approach to a trimmer hard disk is MicroHelp's UnInstaller, which checks your Windows directories for orphan files (those from deleted applications) and duplicate files and offers to erase them. Disk Historian, on the other hand, keeps a statistical database on how frequently a file is accessed. The program then recommends that you delete files that may no longer be in use. Sophisticated queries are a few mouse-clicks away. For instance, you can view all text files that you've accessed more than 25 times in the last 60 days.

If, like me, you accumulate a lot of text files you don't want to delete, you'll love Disk Historian's on-the-fly file compression feature.

Disk Historian was designed carefully. For example, you're warned not to mess with accounting software files, which can go a year between accesses.

Disk Historian wouldn't run on my Gateway 2000 66-MHz 486, and while Solid Oak Software's tech support was friendly and responsive, the staff finally gave up on the problem. (In the interest of full disclosure: My Gateway 2000 is a perennially troubled machine; it's the most likely PC in my office to break a product.) Installed on a Compaq XLS 60-MHz Pentium system, Disk Historian performed like a champ. It deserves a place on your utility shelf.

—Joe Abernathy

Disk Historian

Deletes or archives unneeded or seldom-used files.
Solid Oak Software
800/388-2761
List price: $79.95, network version $495
Reader service no. 816

Feeling Low? Try Home Health Care on CD-ROM

Hypochondriacs—and the rest of us—will appreciate the new HealthSoft CD-ROM titles from Great Bear Technology. These disks help you make a probable diagnosis, study typical medical treatments, and learn what drugs your doctor may prescribe and their possible side effects.

The two Windows titles—Complete Guide to Symptoms, Illness & Surgery and Complete Guide to Prescription & Non-Prescription Drugs—cost $49.95 each. Floppy versions are also available for the same price, but they don't include the 200 color photos of prescription drugs, line art drawings illustrating more than 100 surgical procedures, or pronunciations of 700 generic-drug names.

Combined, the two CD-ROMs make a fairly complete electronic home health care resource. Imagine that one morning you wake up with an upset stomach and a slight fever. You launch the Complete Guide to Symptoms, Illness & Surgery, choose Search from the main menu, then type 'upset stomach AND fever' in the Search dialog box. Up pops another box containing the formidable term 'gastroenteritis'.

Click 'gastroenteritis' to find out more about this malady, including signs and symptoms, likely causes, risk factors, preventive measures, and demographics of those most often affected.

Want more info? The Red Cross icon displays common treatments and medications: For gastroenteritis, Pepto-Bismol and Lomotil are among the options.

You've heard of Pepto-Bismol. But Lomotil? You can research the medicine using the Complete Guide to Prescription & Non-Prescription Drugs. Simply type 'Lomotil' in the Search window, and up pops an information window on Diphenoxylate & Atropine (thank goodness for the pronunciation guide).

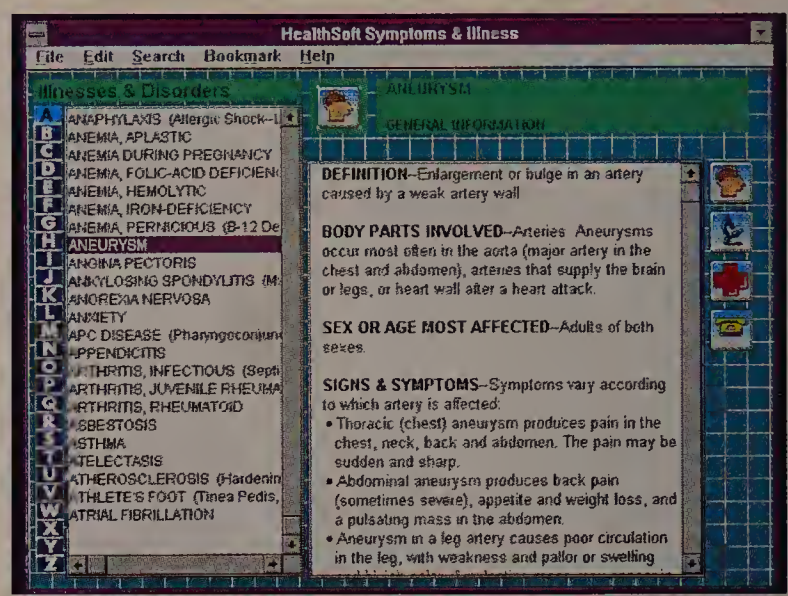
The HealthSoft disks provide an easy, efficient way to research an existing, previous, or imagined condition. There are a few disappointments, though. The Drugs program doesn't provide information about specific drugs, only the drug type; for instance, Halcion and Valium are lumped in one category, but the two medicines are different and have different side effects. And you can't perform a cross-application search. But these are minor problems. Besides, a hypochondriac isn't happy unless there's something to worry about.

—James A. Martin

HealthSoft Complete Guide to Symptoms, Illness & Surgery

HealthSoft Complete Guide to Prescription & Non-Prescription Drugs

MULTIMEDIA **Home health care reference guides.**
Great Bear Technology
800/795-4325,
510/631-1600,
510/631-6735 (fax)
List price: $49.95
Reader service no. 796



HOME HEALTH GUIDE: The HealthSoft CD-ROM titles provide a wealth of information on maladies and remedies.

Consumer Advocate Goes Digital

Consumer advocate and radio talk show host Clark Howard's Consumer Survival Kit CD-ROM launches with a prerecorded message from the man himself: "If there's anything I want you to leave this CD-ROM with, it's that you can have control over your own existence and over your own pocketbook...."

Good advice, especially when you consider that the bottom-line content of Howard's $39.99 CD-ROM can be found in nearly all the available less-expensive consumer advice books. Like those books, the Consumer Survival Kit offers no-nonsense guidance on topics such as investments, returning merchandise, small claims court, buying a home, and how to get an abusive collection agency off your back. Unlike a traditional book, however, the Consumer Survival Kit contains 50-plus minutes of short, amiable talking-head video orations by Howard, and several *action documents*—Microsoft Write templates you can fill in to handle personal matters such as complaints, credit report requests, a credit card number log, and authoring a living will.

Dedicated Howard fans will no doubt appreciate his multimedia efforts, but the rest of us can get the same information by going to the local bargain bookstore or library.

—Joe Hutsko

Clark Howard's Consumer Survival Kit

MULTIMEDIA **Helpful consumer tips and video clips on CD-ROM.**
The Mescon Multimedia Group
800/656-1932,
404/656-1929,
404/656-1926 (fax)
List price: $39.99
Reader service no. 797

Go Ahead, Get Carried Away

GATEWAY 2000
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FALL 1994

The IBM PC Direct Source BOOK

For **PC World** readers:

A special look at IBM PC Direct. Where every IBM system is CustomerFit to your exact needs.

- Great prices on the hottest ThinkPads and ValuePoints.
- Ready-to-run multimedia for winning presentations.
- Printers bred for speed, power... and your network.
- Plus the hottest options and upgrades, the latest software and much, much more.

LOOK FOR OUR LOW PRICES AND SAVE.

IBM®

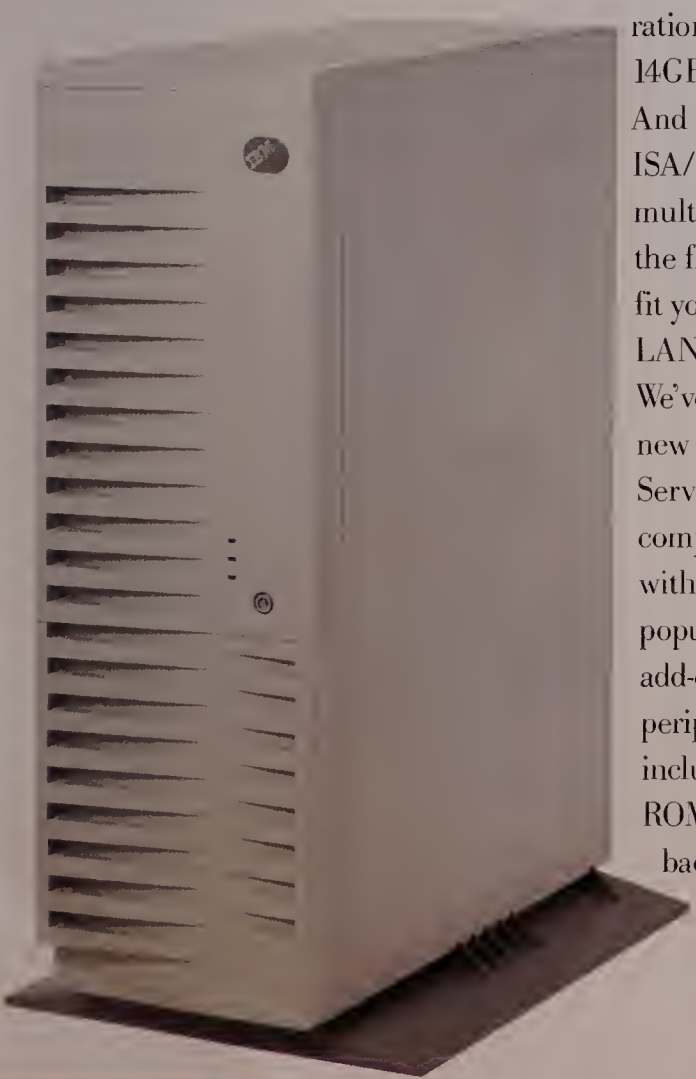
New from IBM PC. A Server designed especially for you.

The PC Server. Performance that's optimized for small and medium size businesses.

We asked you what you wanted in a network server. And your answer was very clear. IBM quality that featured industry standard technology with open architecture. And make it affordable, reliable and easy to service.

So we designed the new IBM PC Server.

It's everything you asked for – and more. Start with your choice of 2 powerful processor chips: 486DX2/66MHz or Pentium™ 60MHz. For your storage needs, you can choose from a variety of hard file configurations with up to 14GB capacity. And our ISA/EISA PCI multi-bus offers the flexibility to fit your specific LAN needs. We've tested the new IBM PC Server to insure compatibility with the most popular LAN add-ons and peripherals including CD-ROMs and tape backups, monitors, printers and plotters, and Ethernet and Token-Ring adapters.



Of course, all IBM PC Servers are covered by our three-year warranty[1] with both onsite service and 24-hour, around-the-clock assistance.

Call an IBM PC Direct Sales Representative for more information. We'll build just the right system – at just the right price – that's perfect for you.

The IBM PC Server includes:

- Intel® Pentium 60MHz or i486™DX2/66MHz with integrated math co-processor. The 486/66MHz is upgradable via Intel's OverDrive™ processor based on Pentium processor technology.
- 256 KB of L2 write-back cache
- Start with a 728MB hard file. (Pentium comes standard with a SCSI-2 1GB hard file.)
- PCI local bus
- 16MB RAM (Pentium) standard, 8MB RAM (486) standard
- I/O slots: 5 ISA/EISA, 3 PCI or 6 ISA/EISA, 2 PCI, depending on use of shared PCI/EISA position
- Six 5.25″ bays and three 3.5″ 1″-high bays
- Support for most popular network operating systems
- 3-year onsite warranty[1]

IBM PC Server
Starting at $3,099

You'll appreciate how easy it is to buy from us.

The Perfect PC starts with CustomerFit.

The perfect computer isn't just a collection of technologies. It's a reflection of the way you work and the work you do. And it's always at a price you can afford. That's why we begin every phone call by listening to you. With CustomerFit, we'll create a complete IBM personal computer system solution that fits the way you work, and the life you live.

A large selection of quality systems, peripherals and software.

ValuePoint™ systems, ThinkPad notebooks, network servers, the hottest

ValuePoint Performance Series

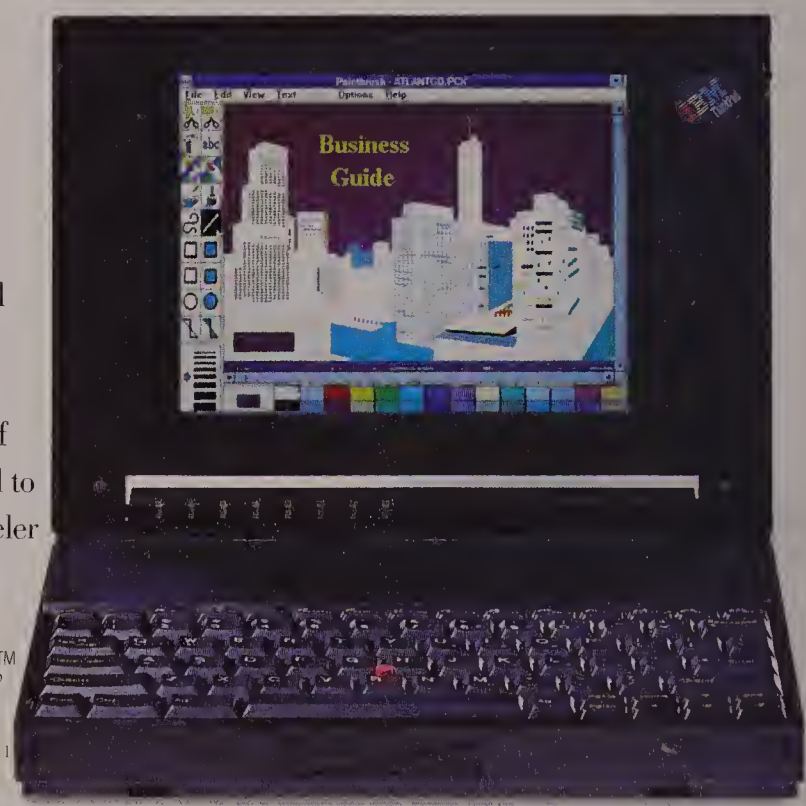
The new ThinkPad 510Cs. For executives who travel light and fast.

You really can take it with you. It's the new ThinkPad® 510Cs subnotebook computer, and it fits true desktop performance into your briefcase or pocketbook.

With IBM's high-performance Blue Lightning™ 486BL2-50 processor, the new ThinkPad 510Cs makes short work of word processing, databases, scheduling, fax and communications, even complicated spreadsheets.

The new ThinkPad 510Cs weighs in at just 4 pounds and features our acclaimed TrackPoint II™ pointing device.

The ThinkPad 510Cs comes preloaded with hundreds of dollars of software essential to the business traveler including Lotus® Organizer,™ SofNet FaxWorks,™ trial subscription to online services[1] and more.



Standard Features for ThinkPad 510Cs:

- High-performance Blue Lightning microprocessor (50/25MHz) with 16KB, four-way associative on-chip cache
- Features a 7.7″ (measured diagonally) VGA color LCD screen supporting 256 colors
- Weighs just 4 lbs.
- 4MB RAM (expandable to 20MB)
- 200MB hard drive
- Runs up to 8 hours on one battery charge
- Measures 7.23″ (W) x 10.11″(D) x 1.67″ (H)
- IBM HelpWare® featuring one-year international traveler's warranty,[2] ThinkPad EasyServ and 24-hour HelpCenter® assistance.

Plus a 3.5″ 1.44MB external floppy drive, 1 Type II or 1 Type I PCMCIA slot, 81-Key Keyboard with IBM integrated TrackPoint II pointing device, rechargeable NiMH battery, AC adapter, a standard MultiPort providing cable management and easy attachment of peripheral devices, and a personalized nameplate.

ThinkPad 510Cs, Starting at.....$1,799

[1] See inside back flap for details.
[2] International traveler's warranty service is available to those customers traveling to countries where this product is sold by IBM or IBM Business Partners. Other restrictions apply. IBM ThinkPad EasyServ is available only in the U.S. For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.

To order:
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applications, even custom-built LANs. At IBM PC Direct™, you'll never need to compromise.

Great prices. Great values.
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Attractive 36-month business leasing plans.[2] Or charge it on American Express®, MasterCard®, Visa or Discover® cards. (Purchase order is available for qualifying customers.)

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Research Triangle Park,
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Prompt delivery.
Your order always gets careful, prompt attention. We also have a variety of delivery options to speed it directly to you. Your Sales Representative has details.

IBM HelpWare for ultimate assistance.

- 30-day moneyback guarantee. A 100% refund (less shipping) on *everything* we sell.[3]
- Round-the-clock service. Whatever you need, whatever your questions, you can call on us, 24 hours a day, 7 days a week.
- 24-hour assistance via our automated fax system (1 800 426-3395), or with your system and modem you can access our bulletin board service (919-517-0001).
- Onsite service is part of every IBM ValuePoint warranty. Thousands of IBM Service Representatives at locations nationwide are ready to respond to your call. No ifs, ands or buts. Ask your Sales Representative.[1]

Note to our customers.
When used to describe hard drive storage, MB stands for one million bytes; total user-accessible capacity may vary slightly based on operating system environment. Unless otherwise noted, IBM products are assembled of domestic and foreign content.

[1] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] IBM Credit Lease prices are quoted for 36-month terms. Lease available to qualified commercial customers only.
[3] Software must be returned in original unopened shrinkwrap.

ThinkPad 4-13

This award-winning family of notebooks proudly offers a new, superfast series that's great for multimedia.

Desktops 14-23

We will CustomerFit a ValuePoint system to meet your unique needs.

Multimedia 24-27

Lights. Camera. Action. Our multimedia systems and options bring work alive with stereo sound and motion.

Options 28-31

Printers & Monitors.....28
Great choices make both you and your work look good.

Storage, Memory and more 29-30
Everything from hard drives to CD-ROM drives to memory.

Software.....31
With Soft Select, you do the choosing—and we do the loading.

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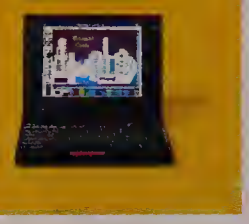

You deserve to travel first class.

America's most coveted notebooks get even better.

"Best Notebook of the Year," "Most Valuable Product," "Product of the Year"[1] – the awards keep mounting. And when you look at the newest offerings from the ThinkPad notebook family, we think you'll know why.

The new ThinkPad 755 series whips along at up to a breathtaking 75MHz, making them superb instruments for displaying a dazzling multimedia presentation in a client's office. "Open up a 755," we like to tell customers, "and you'll make a lasting impression."

Our ThinkPad 360 series has the 486 muscle and 33MHz speed to get the jobs done that most of us need – word processing, spreadsheet, scheduling, database, communications – all at a most competitive price. And removable drives let you add storage or applications – in a wink. With the right accessories, the ThinkPad 360 can be your all-in-one desktop and notebook.

And then there are the little marvels in the subnotebook family, boasting serious 486 computing power and an 81-key keyboard in four-pound-and-under packages that fit any briefcase (and even a lot of pocketbooks).

Just turn the page and see what you think about our new ThinkPad family...

[1] *Mobile Office*, for "Best Notebook of the Year," July 1993 for ThinkPad 500. *PC Computing* for "Most Valuable Product" (Best Notebook Category), Jan. 1994 for ThinkPad 750C. *PC Week Labs* for "Product of the Year," Jan. 1994 for ThinkPad 750C.

ThinkPad

To order:
call 1 800 426-7207

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9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

HelpWare: it comes standard on every ThinkPad.

Every ThinkPad notebook comes fully backed with IBM HelpWare. That means you have a 24- hour, 7-day-a-week partner. Real people, with real answers, whenever you need them. Our Personal Systems HelpCenter consultants are trained to answer your questions.

In addition to the 24-hour HelpCenter telephone service, HelpWare includes access to our 24-hour automated fax system, or with your system and modem access to our bulletin board service.

In the U.S. you also receive IBM ThinkPad EasyServ. During your warranty period, ThinkPad EasyServ comes at no additional cost. Have a problem? Just call the HelpCenter. If your ThinkPad needs service, a courier will come to where you are, pick it up, take it to an IBM Service Center and rush it back to you ready to go, no matter where in the U.S.[1] you are... all at no extra cost to you. You can also get EasyServ after your warranty period, at very affordable prices.

J.D. Power and Associates ranks IBM highest in customer satisfaction among portable computer business users.[2]

ThinkPad 755Cs

[1] IBM EasyServ is available only in the U.S. For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] 1993 J.D. Power and Associates Portable Computing Satisfaction Study. Study conducted among business users.

ThinkPad 755. For a brilliant show. Every time.

ThinkPad 755Cs

Customize your presentation on the way to the client.

Now your sales or new-business staff ean pack a dazzling presentation.

It's all possible with our ThinkPad 755 series notebook, featuring industry-leading processors, removable hard drives, loeal bus vidco, and dazzling dual sean or active matrix eolor screen.

What does this all mean? While you're in that produet briefing, the team in marketing can load their new presentation on your portable hard drive. Plug your drive back in, and on the way over to the elient update the presentation with the relevant finaneials. After a show like that, the elient may be all yours.

The ThinkPad 755 eomes preloaded with hundreds of dollars of software essential to the business traveler including DOS, Windows™, Lotus ec:Mail™, E-mail for the Advantis Network, Lotus Organizer, Lotus Sereencam, Triton CoSession Host, SofNet FaxWorks, a trial subseription to both The PRODIGY Servicc® and America Online,[1] and the Official Airline Guide flight disk.

Small wonder that we say the ThinkPad 755 is the most powerful sales tool ever invented.

[1] See inside back flap for details.

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

Standard Features:

- SL Enhanced Intel 486DX2-50 or Intel DX4-75 processor with 8KB internal cache and integrated math coprocessor
- 4MB RAM (expandable to 36MB)
- 170, 340, or 540MB removable hard drive, 3.5″ 1.44MB removable floppy drive
- Full-sized keyboard with 85 keys (Function Key added for power management, battery power status, audio volume control) and integrated TrackPoint II pointing device
- IBM HelpWare featuring a three-year international traveler's warranty, IBM ThinkPad EasyServ[1] and 24-hour HelpCenter assistance

Plus 1 Type III or 2 Type II or 2 Type I PCMCIA slots, audio in/out jacks, built-in microphone and speakers, rechargeable NiMH battery, AC adapter, preloaded software designed to enhance mobile computing, and a personalized nameplate.

ThinkPad 755C

Features a 10.4″ (measured diagonally) TFT active matrix color screen. Battery life exceeds 3.1 hours of continuous use, up to 8 hours on one charge. Measures 11.7″(W) x 8.3″(D) x 2″(H). Weighs just 6.4 lbs.

ThinkPad 755C with 170MB, 486DX4-75 starting at $5,599

ThinkPad 755Cs

Same as above except with a 9.5″ (measured diagonally) dual scan color screen, 6.1 lbs. Battery life of 3.3 hours continuous use.

ThinkPad 755Cs with 170MB, 486DX4-75 ..... $4,149

Traveling Multimedia for the ThinkPad 755C.

Fully integrated multimedia solution in a mobile system preloaded and preconfigured ready to run. Multimedia package includes 14.4/14.4kbps data/fax modem, Dock 1 with built-in CD-ROM, Asymetrix Compel™, Asymetrix MediaBlitz!™, LapLink V®, Photodex Picture Factory, Talkworks by Audiofile, Multimedia Products Corp. Sound Effects Library, ProPoint by Interlink Electronics, T/Maker Click Art 2000 Incredible Image Collectors CD, and Dock I Carrying Case.

ThinkPad 755C with DX4-75, 540MB, 8MB RAM and Traveling Multimedia Package $9,175

Options for ThinkPad 755[2]

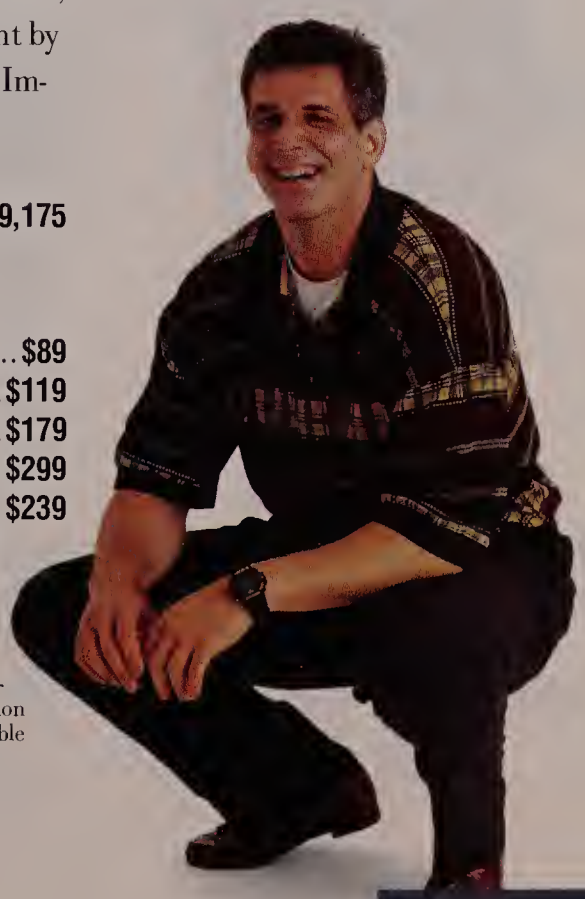
ThinkPad Compact Carrying Case $89
ThinkPad Standard Case $119
ThinkPad Sport Case $179
14.4/14.4kbps PCMCIA Data/Fax Modem (73G7097) **..... $299**
2.4/9.6kbps PCMCIA Data/Fax Modem (73G7098) **..... $239**
Dock I (3545001) **..... $899**
Dock I Carrying Case (TPG8500) **..... $199**

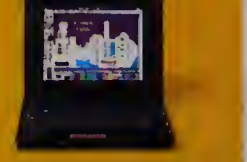
[1] International traveler's warranty service is available to those customers traveling to countries where this product is sold by IBM or IBM Business Partners. Other restrictions apply. IBM ThinkPad EasyServ is available only in the U.S. For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] All options except the PCMCIA Data/Fax Modems are manufactured in Japan.

"Notebook shoppers frequently ask about which color screen they should buy: passive or active matrix? The answer depends on what you are using your notebook for.

"If you are using your system for presentation slide shows or demonstrations to groups of people, then I'd go active matrix. But if you are just using the screen yourself, or showing presentations to one or two people who will have a pretty heads-on view of the screen, then get a dual scan passive matrix. You'll save money."

John Craig
Sales Representative





ThinkPad 500. For those who travel fast and light.

ThinkPad 500

The ThinkPad 500 fits your briefcase. And your budget.

If you'd like something even smaller and lighter than a notebook computer, try our ThinkPad 500 subnotebook. Weighing just 3.4 pounds (with the 85MB hard drive), it fits easily in a briefcase or handbag.

With a 486 processor running at up to a lightning 50MHz, the ThinkPad 500 makes short work of spreadsheets, databases, scheduling, fax and communications, even word processing. Store up to an ample 85MB or 170MB on its hard disk, and interface easily with any PC or network via the PCMCIA slot or external 1.44MB 3.5″ floppy drive.

And you'll appreciate the crisp 7.4″ (measured diagonally) VGA monochrome display, the feel of the 81-key keyboard, and the convenience of our exclusive integrated TrackPoint II pointing device.

So order a ThinkPad 500 today. It will sure lighten your load.

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

Standard Features for ThinkPad 500:

- IBM 486SLC2 50/25MHz processor with 16KB internal cache
- 4MB RAM (expandable to 12MB)
- 85MB or 170MB hard drive
- IBM HelpWare featuring a one-year international traveler's warranty, IBM ThinkPad EasyServ[1] and 24-hour HelpCenter assistance.

Plus a 3.5″ 1.44MB external floppy drive, 1 Type II or 1 Type I PCMCIA slot, 81-key keyboard and integrated TrackPoint II pointing device, rechargeable NiMH battery, AC adapter, preloaded software designed to enhance mobile computing, and a personalized nameplate.

ThinkPad 500: "Subnotebook of the Year" by *PC Computing*.[2]
Features a 7.4″ (measured diagonally) VGA monochrome passive matrix screen. Measures 7.23″(W) x 10.11″(D) x 1.67″(H) and weighs 3.5 lbs.

Sorry, no longer available.

"Every ThinkPad comes with IBM HelpWare, which includes 24-hour HelpCenter assistance. In the U.S. you also get ThinkPad EasyServ during the warranty period. For repair service, a courier will come to your location, pick up your ThinkPad, take it to an IBM-designated service center, and return it to you ready to go—all at no extra cost to you!"

Andra Chapman
Sales Representative

ThinkPad 500 Options

14.4/14.4kbps PCMCIA Data/Fax Modem (73G7097) **$299**
2.4/9.6kbps PCMCIA Data/Fax Modem (73G7098) **$239**
4MB IC DRAM Card[3] (8189098) **$349**
Portfolio Case (TPG6900) **$45**
Rechargeable NiMH Battery (59G9977) **$179**

The new standard in color subnotebooks:
See the new ThinkPad 510Cs
on the inside front cover.

[1] International traveler's warranty service is available to those customers traveling to countries where this product is sold by IBM or IBM Business Partners. Other restrictions apply. IBM ThinkPad EasyServ is available only in the U.S. For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] November 1993
[3] Manufactured in Canada.

ThinkPad 360. Performance minded. Value priced.

ThinkPad 360Cs

The ThinkPad 360 is more than enough computer for most business needs, at a price any business can afford.

With 486 processors running at a brisk 33MHz, the ThinkPad 360 series whips through word processing, spreadsheets, databases, communications and other popular office and executive tasks.

Screens come in mono, active matrix or dual scan color, all with local bus video. PCMCIA slots allow for easy expansion and communications. Better yet, removable drives add storage or applications in seconds, as your needs require.

The ThinkPad 360 comes preloaded with hundreds of dollars of software essential to the business traveler, including DOS, Windows, Lotus cc:Mail, Organizer, E-mail for the Advantis Network, Lotus Organizer, Lotus Screencam, Triton CoSession Host, SofNet FaxWorks, a trial subscription to both The PRODIGY Service and America Online,[1] and the Official Airline Guide flight disk.

Best of all are the full-sized IBM keyboards with our acclaimed integrated TrackPoint II pointing device. Factor in long battery life and our convenient "Suspend/Resume" feature that lets you pick up working where you left off without having to reboot and reload, and you have a fistful of computer. For less than a fistful of dollars.

[1] See inside back flap for details.

To order:
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8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

Standard Features:

- SL Enhanced Intel 486SX/33MHz processor with 8KB internal cache
- 4MB RAM (expandable to 20MB)
- 170 or 340MB removable hard drive
- Full-sized keyboard with 85 keys (Function Key added for power management and battery power status) and integrated TrackPoint II pointing device
- IBM HelpWare featuring a one-year international traveler's warranty. IBM ThinkPad EasyServ[1] and 24-hour HelpCenter assistance

Plus a 3.5″ 1.44MB removable floppy drive, 1 Type III or 2 Type II or 2 Type I PCMCIA slots, rechargeable NiMH battery, AC adapter, preloaded software designed to enhance mobile computing, and a personalized nameplate.

ThinkPad 360[2]

Features a 9.5″(measured diagonally) monochrome screen. Provides up to 10 hours on one battery charge. Measures 11.7″(W) x 8.3″(D) x 1.7″(H). Weighs 5.6 lbs.

ThinkPad 360 with 170MB Hard Drive, starting at.....$2,099
ThinkPad 360 with 340MB Hard Drive, starting at.....$2,599

ThinkPad 360C[2]

Features an 8.4″ (measured diagonally) TFT color screen. Provides up to 7 hours on one battery charge. Measures 11.7″(W) x 8.3″(D) x 1.8″(H). Weighs 6.1 lbs.

ThinkPad 360C with 170MB Hard Drive, starting at.....$3,699

ThinkPad 360Cs[2]

Features a 9.5″(measured diagonally) dual scan color screen. Provides up to 8 hours on one battery charge. Measures 11.7″(W) x 8.3″(D) x 2″(H). Weighs 6.2 lbs.

ThinkPad 360Cs with 170MB Hard Drive, starting at $2,699
ThinkPad 360Cs with 340MB Hard Drive, starting at.....$3,199

ThinkPad 360Cs[2] with Traveling Multimedia

A 360Cs fully loaded with our traveling multimedia package as described on page 7.

ThinkPad 360Cs with 340MB Hard Drive, 8MB RAM and Traveling Multimedia Package, starting at $5,699

Options for ThinkPad 360 Series[3]

NiMH Battery (84G2392).....$139
250MB Hard Drive (84G2391).....$629
14.4/14.4kbps PCMCIA Data/Fax Modem (73G7097).....$299
2.4/9.6kbps PCMCIA Data/Fax Modem (73G7098).....$239
4MB IC DRAM Card (84G5689).....$369
8MB IC DRAM Card (84G5692).....$759
Port Replicator (66G3520).....$109
ThinkPad Sport Case, Dark Green (TPG12003).....$179

[1] International traveler's warranty service is available to those customers traveling to countries where this product is sold by IBM or IBM Business Partners. Other restrictions apply. IBM ThinkPad EasyServ is available only in the U.S. For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] ThinkPad 360 Series is manufactured in Mexico..
[3] All options except the PCMCIA Data/Fax Modems are manufactured in Japan.

"Port replicators are changing the way we think about notebooks and subnotebooks. With a port replicator, your notebook can function as both desktop and portable. At your desk, the port replicator allows you to plug into a full-size monitor, keyboard, printer and other peripherals. One snap and you're fully connected. When you're ready to hit the road, unsnap it and you're fully mobile. No more updating files, notebook to desktop and back. Pretty nifty, right?"

Hugh Carpenter
Sales Representative

From docks to cases, we have every option covered.

Tested, warranted and supported by manufacturer to ThinkPad Compatibility Standards.

Dock I shown with both ThinkPad 750Cs and optional CD-ROM drive

Interfacing is a snap with an IBM Port Replicator.

Give your ThinkPad instant expandability with our port replicators. An easy, one-step snap-in connection links you with peripherals and unsnarls cable management.

Port Replicator (66G3520).....**$109**

Launch your ThinkPad into the multimedia universe with our Mobile Docking Station.[1]

Watch your business presentations blast off under full power from our portable ThinkPad Dock I Docking Station. In your office or on the road, fail-safe, one-step docking instantly connects you to built-in stereo speakers, microphone and headphone jacks. An expansion bay holds an optional CD-ROM or an additional hard drive.

Mobile Docking Station (3545001).....**$685**
CD-ROM with Installation Kit (66G3536).....**$449**
170MB Hard Drive (66G2847).....**$649**

Black Keyboard

It's a space-saving IBM 101-Key Keyboard with an integrated TrackPoint II pointing device. And it's color coordinated to your ThinkPad.

Black Keyboard (84G2524).....**$186**

[1] Docking Station and CD-ROM are manufactured in Japan.

Black Keyboard

ThinkPad

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

Apex PCMCIA fax modem and Megahertz X-Jack PCMCIA data/fax modem

Megahertz® PCMCIA modems provide you with the ultimate connections.

Get ultimate convenience and optimum performance from your ThinkPad notebook with compact, fully compatible, easy-to-install Megahertz PCMCIA notebook data/fax modems.

- ★ **Megahertz 2400/9600bps PCMCIA Data/Fax** (MM06605).....**$199**
- ★ **Megahertz 9600/9600bps PCMCIA Data/Fax** (MM52436).....**$269**
- ★ **Megahertz 14.4/14.4kbps PCMCIA Data/Fax** (MM03600).....**$319**
- ★ **Megahertz X-Jack 2400/9600bps PCMCIA** (MM41189).....**$199**
- ★ **Megahertz X-Jack 9600/9600bps PCMCIA** (MM52459).....**$269**
- ★ **Megahertz X-Jack 14.4/14.4kbps PCMCIA** (MM04048).....**$319**

Apex PCMCIA modems[1] are a snap to use.

Apex PCMCIA data/fax modems offer speed, convenience, reliability and are a snap to install in your ThinkPad notebook.

- ★ **Apex 9600/9600bps PCMCIA Data/Fax** (MM34446) **$206**
- ★ **Apex 14.4/14.4kbps PCMCIA Data/Fax** (MM34482).....**$299**

Add CD-ROM and hard drives to your mobile system.

These breakthrough MiniSCSI™ parallel-to-SCSI and PCMCIA adapters from Adaptec® let you hook up to seven devices through your parallel port or PCMCIA slot.

- ★ **Adaptec Mini SCSI EPP** (MM35343).....**$199**
- ★ **Adaptec Mini SCSI Plus**[2] (MM35317).....**$159**
- ★ **Adaptec Slim SCSI PCMCIA**[2] (MM67752).....**$289**

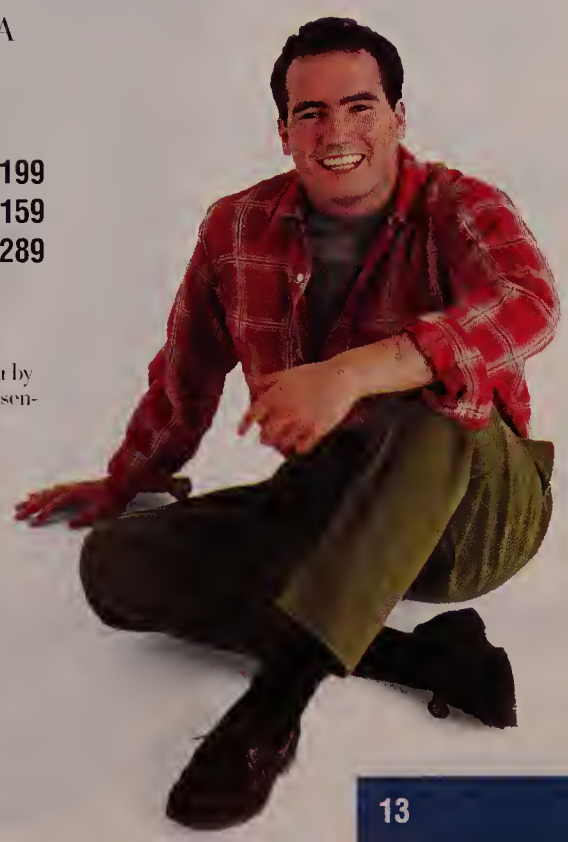
[1] Manufactured in Taiwan.
[2] Manufactured in Singapore.
Note: Warranty, service and support for non-IBM products are provided directly to you by the non-IBM manufacturer, supplier or publisher of the product. IBM makes no representations or warranties regarding non-IBM products.

★ Indicates a ThinkPad Proven product.

"PCMCIA looks intimidating, but it's really very simple. You see, these lightweight, credit card-sized adapters give your notebook added capabilities like mass storage and communications. And they're a snap to install in the PCMCIA expansion slots.

"All you need to know is that PCMCIA cards come in three different types: Type I, Type II and Type III. With PCMCIA slots you can increase memory, add a data/fax modem, a communications card, LAN cards (like Ethernet and Token-Ring adapters) and even add another hard disk drive."

Kevin Fagan
Sales Representative



This time, do it right. Make it CustomerFit.

ValuePoint P60/D,
February 1994

There is only one standard when it comes to buying the best PC system: what's best for your business needs.

That's why we developed CustomerFit—to insure that you get precisely the PC you need, at a priee you can afford. Our specially trained Sales Representatives are standing by to help you.

Getting started.

Step one: ask yourself, what are you going to use the system for?

Be honest with yourself. After all, you don't need the fastest system made if you are doing word proeessing and spreadsheet analysis.

But recognize the first rule of the computer age:

Once you get comfortable with your system, you're going to find other uses for it.

For example, a data/fax modem may seem like a luxury. But it's usually cheaper than a fax maehine. Plus you ean "talk" with other computers, exchange files, do researeh on new business, and get technical and business adviee from around the country.

The basics.

There are really just a few things you need to know when buying a system.

First, how **fast** is the eomputer? The newest applieations are designed to run best with at least a **486 processor.** (All IBM PC Direct systems use at least a 486 or faster chip.)

They eome in different **clockspeeds**... from 25MHz up to 100MHz.

For word processing and simple spreadsheets, 25 or

Desktops

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

33MHz is fine. For more graphics-intensive applications (including presentation software) or complex engineering programs, you may want 33, 50 or 66MHz or even a step up to Pentium.

Then select the **memory** you need (called RAM). RAM really influences the speed of your computer, too. If you have a 486 system and it seems balky, the problem is usually insufficient memory. The more RAM, the more applications you can open at one time and the faster you can run them.

Storage is simply the size of your hard drive. It stores your programs when they're not in use.

Plan ahead, because every year upgrades to existing applications take up more and more space as they become more complex (and more useful).

Now is also a great time to think about a tape backup unit to protect your data.

Thinking ahead will save you time and money.

Monitors.
If you don't have the right monitor, you won't like your system.

So get one that's **non-interlaced** with a **high refresh rate** (flicker-free to you and me).

Peripherals and other add-ons.
We talk about peripherals and add-ons like they're options. And they are. But you can save money, time, and frustration by ordering them with your system.

Preloaded software.
It's great to be able to be up and running right out of the box. We can preload, test and configure your favorite software on most systems. (Ask your Sales Representative about **Soft Select**™.)

HelpWare.

- 30-day moneyback guarantee. A 100% refund (less shipping) on *everything* we sell.
- Round-the-clock support. Wherever your need, whatever your questions, you can call on us 24 hours a day, 7 days a week.
- 24-hour assistance via our automated fax system, or with your system and modem via our bulletin board service.

HelpWare. Not just onsite—incomparable!
Thousands of IBM Service Representatives at locations nationwide are ready to respond to your call. No ifs, ands or buts. Onsite service is part of every IBM ValuePoint warranty. Ask your Sales Representative.[1]

[1] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.

ValuePoint Si. Performance minded. Price sensitive.

425SX/Si

Desktops

If you're looking for power packaged at the lowest price, then the ValuePoint Si is your system.

The ValuePoint Si, with its powerful Intel 486 processor and 212MB-and-up storage capacity, makes quick work of your word processing, spreadsheet, record keeping and other daily business chores. And you can select your system's processing speed, from a 25MHz SX to a 66MHz DX2.

Standard memory on the Si is 4MB, ample capacity for Windows-based applications, and is upgradable to 64MB for tackling those big number-crunching and graphics-intensive tasks. The Si's VESA local bus graphics features 512KB video memory, upgradable to 1MB for even faster graphics performance.

And with Energy Star-compliant[1] Si's available in our 425SX models, you can save money running your computer, because it uses less energy.

While the ValuePoint Si makes an economical standalone or efficient client, it also is the perfect terminal for connecting with your corporate mainframes. And every ValuePoint Si comes with HelpWare, including 1-year onsite warranty[2] and 24-hour HelpCenter assistance.

If you don't see what you want, call us with your special needs. We'll be happy to put together a customized system that fits your every workstation need.

IBM PC Direct has a ValuePoint system that is configured and ready to attach to your AS/400® system right out of the box. Call for details.

ValuePoint 425SX/Si

For many, this all-purpose system is all you'll ever need. And it comes at a price you can easily afford.

- Intel 486SX/25MHz processor
- 212MB hard disk drive
- 4MB RAM upgradable to 64MB
- VESA local bus graphics
- IBM Basic Keyboard, IBM Mouse
- DOS and Windows preloaded

425SX/Si, monitor not included, only $949

ValuePoint 433DX/Si

An all-purpose machine that can handle heavy workloads without exacting a heavy price.

- Intel 486DX/33MHz processor, upgradable to P24T
- 212MB hard disk drive
- 4MB RAM upgradable to 64MB
- VESA local bus graphics
- IBM Basic Keyboard, IBM Mouse
- DOS and Windows preloaded

433DX/Si, monitor not included, only $1,289

ValuePoint 466DX2/Si

An entry-priced system for fast graphics, presentation and design computing.

- Intel 486DX2/66MHz processor, upgradable to P24T
- 212MB hard disk drive
- 4MB RAM upgradable to 64MB
- VESA local bus graphics
- IBM Basic Keyboard, IBM Mouse
- DOS and Windows preloaded

466DX2/Si, monitor not included, only $1,689

[1] Selected configurations are Energy Star compliant. Check with your Sales Representative for details. EPA, as a matter of policy, does not endorse any particular company or its products.
[2] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.

▼ Look for the ValuePoint symbol throughout the catalog. It indicates which options can be installed on most systems right at the factory.

To order: call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available for qualifying customers.

"Callers often want to know why they should get a bigger hard drive than they need.

"Two reasons. First, you're going to find new ways to use your computer to make your job (or life) easier. Everybody does. Second reason: when the newest versions of your favorite software come out, they will require more storage space than current versions do. For example, Word for Windows just went from about 9MB to 15MB.

"Since the least expensive time to buy a hard drive is with the system, you'll save money by buying a bigger hard drive now."

Susan Martin
Sales Representative

ValuePoint Performance Series. Investment protection.

ValuePoint Performance Series

You've never seen a system like the all new ValuePoint Performance Series. It's like you designed it.

Because it's the product of asking hundreds of customers what they wanted in a system. The answer was simple. They wanted a system that protected their investment...that wasn't obsolete in 6 months. And they wanted it with a **3-year limited warranty**.[1]

So open your arms and greet the ValuePoint Performance Series. It has blazing processing power that takes the toughest workloads head-on – from sophisticated graphics presentations to elaborate spreadsheet analyses, to extensive business reports. What's more, each model is flexible and upgradable. Do you think you need faster clockspeed in 6 months? You can choose from the 33MHz SX up to a 100MHz DX4, and upgrade it later.

[1] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.

Desktops

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

You can order either VESA local bus or PCI local bus expansion capability. Either way you get blazing fast power. Plus the ValuePoint Performance Series is so flexible that you can change your mind later and convert from one bus system to the other. Of course, you can also expand RAM (up to 128MB) and change or add on hard drives for more storage.

Plus your ValuePoint Performance Series introduces the new industry-standard Plug and Play capability for easy upgrading and maintenance. Many configurations are Energy Star compliant[1] for low-power, cost-saving operation. And we offer up to 2MB video memory for supergraphics performance.

Give us a call. Let us CustomerFit the new ValuePoint Performance Series to your special needs. (SpaceSavers,[2] Desktops and Mini-Towers are available.) This is the one system that will grow as your business grows. And it's covered with a **3-year limited warranty.**[3]

ValuePoint Performance Series 433SX

A low-cost system that gives you optimum growth possibilities.

- Intel 486SX/33MHz processor
- 270MB hard disk drive
- 4MB RAM upgradable to 128MB
- 64-bit VESA local bus with 1MB video memory (upgradable to 2MB)
- SpaceSaver configuration
- IBM Basic 101-Key Keyboard, IBM Mouse
- DOS and Windows preloaded

433SX, monitor not included, only.....$1,385

ValuePoint Performance Series 433DX

Step up to the increased power, storage and expansion capabilities of this do-it-all-for-less system.

- Intel 486DX/33MHz processor (Pentium[4] P24T upgradable)
- 270MB hard disk drive
- 4MB RAM upgradable to 128MB
- 64-bit VESA local bus with 1MB video memory (upgradable to 2MB)
- Desktop configuration
- IBM Enhanced 101-Key Keyboard, IBM Mouse
- DOS and Windows preloaded

433DX, monitor not included, only.....$1,595

[1] Selected configurations are Energy Star compliant. Check with your Sales Representative for details. EPA, as a matter of policy, does not endorse any particular company or its products.
[2] SpaceSaver platform is available only with VESA local bus.
[3] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[4] Upgradable with Intel's OverDrive processor based on Pentium processor technology.

▼ Look for the ValuePoint symbol throughout the catalog. It indicates which options can be installed on most systems right at the factory.

"For years the bane of PC owners everywhere has been installing new hardware and peripherals. Setting DIP switches and checking (and changing) interrupts brought experienced users to their knees.

"That's about to change. The industry is implementing 'Plug and Play' standards that will allow you to simply plug in any new device. Your system's software will automatically sense the new device's needs and reconfigure your system (or the device) accordingly. By the way, the new ValuePoint Performance Series is Plug and Play compliant."

Buck Lawler
Sales Manager

No one else offers a system like the ValuePoint Performance Series.

ValuePoint Performance Series Mini-Tower

Desktops

3-Year Limited Warranty.
IBM stands solidly behind every ValuePoint computer we build, with a 3-year warranty[1] on our Performance Series. That includes one-year onsite and two-year carry-in service. That's one of the best in the industry, and indicative of our commitment to your total satisfaction – no matter what the size of your business.

Plug-and-Play.
Adding more power or peripherals to your computer doesn't have to mean changing jumper pins or DIP switches. With ValuePoint's Plug and Play technology, just plug in your new Plug and Play enabled card and your computer does the rest. It makes expanding your computing capabilities a snap.

[1] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.

Energy Savings.
You'll be pleased to know that most ValuePoint Performance Series desktop systems meet or exceed the reduced energy guidelines set by the Environmental Protection Agency. By consuming considerably less power than typical desktop PCs, Energy Star compliant[1] models do more than help conserve energy. They conserve money too.

Improved Local Bus.
With VESA local bus technology, your ValuePoint computer speeds data to your system's video and other components with blazing 64-bit speed. The result is superfast graphics performance and increased productivity overall. Plus, the ValuePoint Performance Series also features a local bus IDE controller that supports up to 4 IDE devices including hard drives and CD-ROMs.

SpaceSaver,[2] Desktop and Mini-Tower models are available.

The new 100MHz DX4 Processor.
Seeking the latest in 486 speed, the ValuePoint Performance Series now offers the new 100MHz DX4 processor, for no-wait performance and lightning-fast execution of your business tasks.

ValuePoint Performance Series 466DX2.
An excellent choice for work-intensive offices, where power, speed and future expansion are of prime importance.

- Intel 486DX2/66MHz processor
- Pentium[3] P24T upgradable
- 270MB hard disk drive
- 4MB RAM upgradable to 128MB
- VESA local bus with 1MB (upgradable to 2MB)
- 128K L2 cache
- Desktop configuration
- IBM Enhanced 101-Key Keyboard, IBM Mouse
- DOS and Windows preloaded

466DX2, monitor not included, only $1,825

ValuePoint Performance Series 100DX4.
State-of-the-art 486 speed for enhanced productivity.

- Intel 486DX4/100MHz processor
- Pentium P24T upgradable
- 364MB hard disk drive
- 8MB RAM upgradable to 128MB
- PCI local bus option installed
- 256K L2 cache
- Tower configuration
- IBM Enhanced 101-Key Keyboard, IBM Mouse
- DOS and Windows preloaded

100DX4, monitor not included, only $2,755

[1] Selected configurations are Energy Star compliant. Check with your Sales Representative for details. EPA, as a matter of policy, does not endorse any particular company or its products.
[2] SpaceSaver platform is available only with VESA local bus.
[3] Upgradable with Intel's OverDrive processor based on Pentium processor technology.

▼ Look for the ValuePoint symbol throughout the catalog. It indicates which options can be installed on most systems right at the factory.

To order:
call 1 800 426-7207

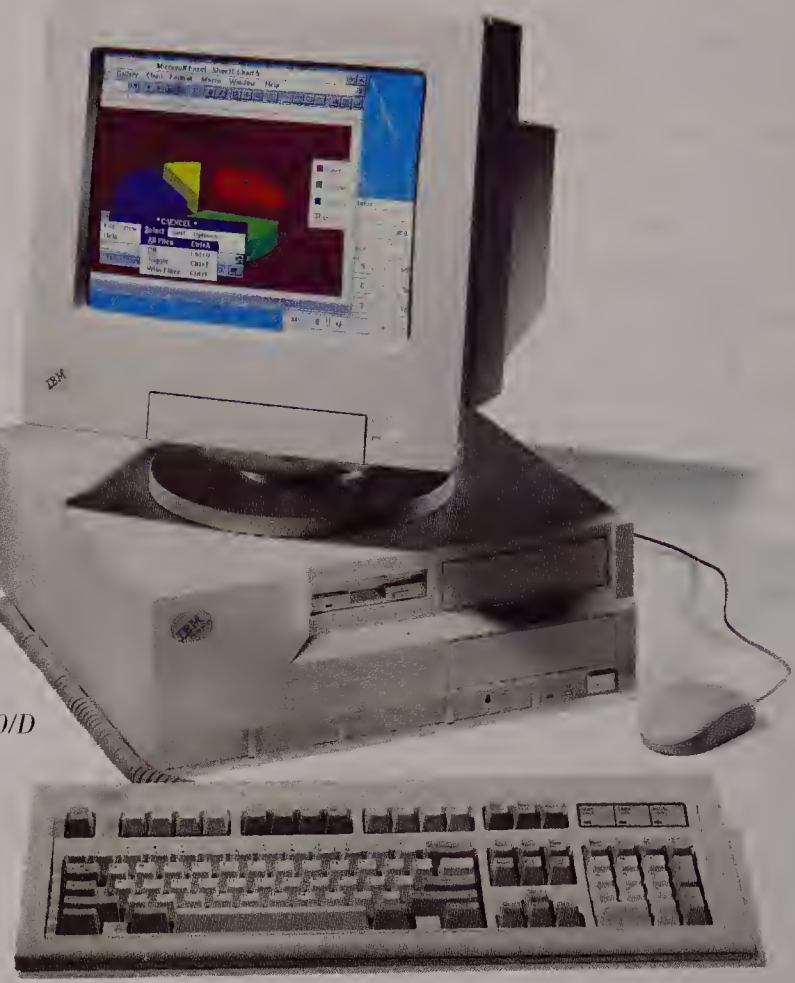
8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available for qualifying customers.

"When running graphics applications, your computer may seem slower than you think it should be. The solution may be local bus. Local bus is a design feature that speeds up the flow of data throughout the system.

"All ValuePoint systems feature high-performance local bus video. In fact, the new ValuePoint Performance Series offers both VESA local bus (also called VL-Bus) and PCI local bus expansion. VL-Bus is a design that has long been favored in 486 processor systems. PCI is a system that was designed in conjunction with Pentium systems but is not Pentium dependent. Either choice means putting your video into fast mass transit."

Gina Short
Sales Representative

ValuePoint P60/D. Power priced for business.



P60/D

The ValuePoint P60/D takes full advantage of the Pentium 64-bit processor with PCI local bus graphics, a 256KB L2 cache (standard), and up to 128MB of system memory. Storage is also measured in superlatives with the arrival of the optional, new 728MB hard disk drive.

The ValuePoint P60/D is the perfect business solution for your most power-hungry departments. And of course each ValuePoint P60/D is backed by HelpWare, including a one-year onsite warranty[1] and 24-hour HelpCenter assistance.

ValuePoint P60/D.

Perform your most demanding graphics and data-intensive tasks with awesome 64-bit processing ease. A system without rival.

- 60MHz Pentium[2] processor, OverDrive upgradable
- 527MB hard disk drive
- 8MB RAM upgradable to 128MB
- PCI local bus with 1MB (upgradable to 2MB)
- 256KB L2 cache
- IBM Enhanced 101-Key Keyboard, IBM Mouse
- DOS and Windows preloaded

ValuePoint P60/D, monitor not included $2,440

[1] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[2] Upgradable with Intel's OverDrive processor based on Pentium processor technology.

Desktops

PS/2 E. Economically correct.

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

The PS/2 E combines ecology and economy in one affordable package.

For energy efficiency, this remarkable money-saver exceeds EPA Energy Star[1] requirements. This means energy savings to you. It saves even more through its optional Energy Saver Color Monitor and its power management utilities. The PS/2 E takes up less space, too. And since it produces less heat and requires no fan, it's quieter.

The health-conscious 9507 TFT monitor also meets new standards for low electromagnetic and electrostatic emissions, and its flicker-free picture is easy on the eyes.

If you think all this comes at the expense of power and performance, think again. The PS/2 E packs a 486/50MHz processor, 8MB of internal memory, a 16KB cache and a 120MB hard drive. Meaning, if you want to accomplish a full range of business tasks at low cost to you – and the environment – the PS/2 E should be your indisputable choice.

"You might be surprised at the total power requirements of a conventional PC (including idle time and air conditioning to fight heat buildup).

"That's why the Environmental Protection Agency began the Energy Star program. It recognizes energy-frugal desktop PCs. To qualify for Energy Star status, a desktop PC must consume considerably less power than typical desktop PCs.

"Our PS/2 E and many of our ValuePoint systems exceed the Energy Star requirements."

Mike Bowers
Sales Representative

PS/2 E.

- IBM 486SLC2 50/25MHz processor
- 120MB hard disk drive
- 8MB RAM (16MB optional)
- IBM 14P Energy Saver Color Monitor (maximum diagonal viewable screen size is 13″)
- XGA®-2 graphics support on system board
- IBM Quiet® Touch Keyboard with built-in integrated TrackPoint II pointing device plus numeric keypad port and mouse port
- Supports 4 Type I or 4 Type II or 2 Type III PCMCIA devices
- DOS and Windows preloaded
- 24-hour, 7-day toll-free assistance
- IBM HelpWare featuring a 3-year warranty,[2] first year onsite, and 24-hour, 7-day HelpCenter assistance

PS/2 E, with 14P Monitor
(maximum diagonal viewable screen size is 13″) **$2,474**
PS/2 E, with TFT Monitor[3] (as shown) **$5,314**

[1] EPA as a matter of policy does not endorse any particular company or its products.
[2] For information regarding IBM's limited warranty, ask your Sales Representative. Copies are available upon request.
[3] Manufactured in the United Kingdom.

PS/2 E with optional 9507 TFT Color Monitor

Multimedia

Ready for the show.

Every ValuePoint Performance Series system is a multimedia giant in waiting.

Start with any ValuePoint Performance Series system. It's a multimedia maven in disguise. With design features like 64-bit graphics performance and built-in video accelerators, they were built to make multimedia fly.

To harness that power, all you need is a ValuePoint Performance Series Multimedia System.

It starts with the Performance Series system of your choice. Add the multimedia hardware bundle which includes a double speed, MPC2℠ compliant CD-ROM drive. It offers fast access to CD applications and resources including Kodak® Photo CDs. It also includes a Sound Blaster™ adapter and software that adds 16-bit stereo sound capability to your PC.

To complete your system add the optional stereo speakers and microphone or an IBM MM-1 Multimedia Audio Box (includes speakers and microphone).

For a great family value in multimedia software ask your sales representative about our Multimedia Software Bundle.

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

ValuePoint Performance Series configured for multimedia

"The CD-ROM is the basic building block for a multimedia system. And there's a lot of confusion about standard format, XA and Kodak multisession compatibility. There are three increasingly powerful formats: standard CD-ROM, CD-ROM XA and CD-ROM XA with Photo CD multisession capability. For multimedia, you want at least an XA (for Extended Architecture). In most cases, you'll also want a multisession to ensure compatibility with Kodak Photo CDs. Multispeed or multispin drives will give you faster performance, too."

Sammy Kinlaw
Sales Representative

Five great CD-ROMs including the Compton's Interactive Encyclopedia, Mayo Clinic Family Health Book, Quicken® for Windows – Deluxe Edition, King's Quest VI™, and Kodak Photo CD Access Software and Photo Sampler can be loaded on your system for one low price.

Of course, everything is covered under our 30-day money-back guarantee, and supported by our famed 24-hour, around-the-clock HelpCenter.

ValuePoint Performance Series Multimedia Systems:
ValuePoint Performance Series ..... **Starting at $1,599**
Add a Double Speed CD-ROM,
Sound Blaster 16-bit Sound Card and cables for only..... **$314**
Add the Multimedia Software Bundle (described above) for only **$159**

For a complete system:
LabTek CS 800 Speakers (and adapter) (MM18852)..... **$31**
LabTek Microphone (MM11186) **$9**
IBM Multimedia Audio Box MM-1 (9529001) **$159**

Whether you're putting the finishing touches on your new system or upgrading your present system, we can CustomerFit a multimedia system just for you.

Monitors. Printers. CD-ROMs. Multimedia accessories from sound cards to software. Tape backup systems to protect your data. Add a hard drive (or two). Add RAM. Enjoy the precise, exclusive touch of an IBM keyboard. Network adapters, emulators and connectors. All the latest software applications.

Whew! That's a lot. But you can do it all in the pages that follow. And if you don't see what you want (for example, removable storage options like opticals and floptticals), just ask your Sales Representative.

Multimedia options. High impact comes standard.

Creative Labs Edutainment CD 16

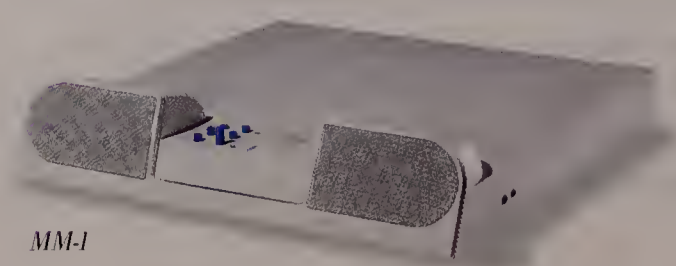
Creative Labs Edutainment CD 16 Kit.
The complete multimedia solution. This all-in-one kit comes with a double-spin CD (Kodak compatible), Sound Blaster 16 Audio Card, stereo speakers and 8 reference and entertainment CD-ROMs with more than 5 gigabytes of data, software and fun.

Creative Labs Edutainment CD 16 Kit[1] (MM56146) **$465**

MM-1.
The MM-1 is a sound/display system that is a must for businesses using multimedia capability. It provides a stylish combination monitor stand with stereo speakers.

MM-1[2] (9529001) **$159**

[1] Manufactured in Singapore.
[2] Manufactured in Japan.
Note: Warranty, service and support for non-IBM products are provided directly to you by the non-IBM manufacturer, supplier, or publisher of the product. IBM makes no representations or warranties regarding non-IBM products.



MM-1

Multimedia

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available for qualifying customers.

AudioVation Kit

AudioVation.
Create multimedia with CD-quality sound. Add voice, music, sound effects and other audio to your multimedia presentations. Includes the state-of-the-art AudioVation ISA adapter, drivers, 6 CD titles, microphone, speakers, cables and a multisession CD-ROM that is Kodak and MPC[1] Level 2 compliant.

AudioVation Kit
(60G3880) **$575**

AudioVation ISA Adapter
(60G3878) **$205**

LabTek Speakers.
Give your PC great stereo sound with these 3″ high amplified micro stereo speakers. Works with all PCs, PC sound cards, and portable electronics too!

LabTek Speakers CS 150
(MM11106)..... **$19**

[1] Multimedia PC Marketing Council

Asymetrix MediaBlitz!: the affordable multimedia studio.
You can easily combine and synchronize sound, animation and digital video into spectacular multimedia shows. Includes 100MB of sound, video, animation and graphics files.

Asymetrix MediaBlitz!
(MM25398)..... **$72**

Asymetrix Compel: the affordable presentation program.
Combine audio, animation, video, charts and more into a professional-quality show.

Asymetrix Compel
(MM22720)..... **$225**

Intel Smart Video Recorder puts the power of video into your PC.
Intel's smart plug-and-shoot design lets you start inserting business videos into your PC right away. Faster than other boards, it uses 1/5 the hard disk space. Plus we ship it with $748 worth of very smart software including Microsoft's Video for Windows.

Intel Smart Video Recorder
(MM26079)..... **$549**

"Multimedia shoppers are frequently concerned about compatibility with future multimedia advances. That's why the Multimedia PC Marketing Council has established a new multimedia performance standard called the Multimedia PC Level 2 Specification.

"Most of our ValuePoint multimedia systems meet the Multimedia PC Marketing Council's specs. So when you buy an MPC-compliant system from IBM PC Direct, you're in the comfort zone. You know you're compatible with all MPC titles."

Susan Zitofsky
Sales Representative

Intel Smart Video Recorder

Looking good.

Color Jetprinter PS 4079

4039 LaserPrinter 12R plus

The right printer makes a lasting impression . . .

2390 *plus* Personal Printer II[1] (75G6455) **$369**
ExecJet® II 4076 (75G6457) **$299**
4037 5E LED Page Printer (75G6450) **$705**
4039 LaserPrinter 10R (75G6244) **$1,479**
4039 LaserPrinter 12R *plus* (08H1025) **$1,555**
4039 LaserPrinter 12L *plus* (08H1024) **$2,039**
4039 LaserPrinter 16L *plus* (08H1023) **$3,015**
Color Jetprinter PS 4079 (56G8207) **$2,739**

While IBM monitors add to your image.

IBM 12M Monochrome Monitor[2]
(maximum diagonal viewable screen size is 10.3″) **$215**
IBM 14L8 SVGA Color Monitor
(maximum diagonal viewable screen size is 13″) **$329**
IBM 14V Color Monitor
(maximum diagonal viewable screen size is 13″) **$429**
IBM 14P Color Monitor
(maximum diagonal viewable screen size is 13″) **$549**
IBM 14PT Color Touch Monitor
(maximum diagonal viewable screen size is 13″) **$1,179**
IBM 15V Color Monitor
(maximum diagonal viewable screen size is 13.7″) **$579**
IBM 15P Color Monitor
(maximum diagonal viewable screen size is 13.7″) **$699**
IBM 15PT Color Touch Monitor
(maximum diagonal viewable screen size is 13.7″) **$1,379**
IBM 17P Color Monitor[3]
(maximum diagonal viewable screen size is 15.3″) **$1,199**
IBM 21P Color Monitor[1]
(maximum diagonal viewable screen size is 19″) **$2,245**

[1] Manufactured in Japan.
[2] Manufactured in Taiwan.
[3] Manufactured in Finland.

21P Color Monitor (maximum diagonal viewable screen size is 19″)

Options

To order:
call 1 800 426-7207

8am-10pm M-F, EDT;
9am-5pm Sat., EDT.
Purchase order is available
for qualifying customers.

8MB 70ns
Memory Upgrade

"Not all computers – even with identical Intel processors – will run with the same speed. One big reason is external cache.

"A regular system transfers data from the disk to RAM at 16 bits per operation. That's like a teaspoon. IBM L1 and L2 Cache transfer data at either 128 or 256 bits per operation. That's like a ladle. If you have ever taken soup from a pot, I'll bet you know how much faster the ladle is."

Carl Spangler
Sales Representative

Improve your memory . . .

4MB 70ns SIMM-IBM 72-Pin (92G7200) **$265**
8MB 70ns SIMM-IBM 72-Pin (92G7202) **$529**
16MB 70ns SIMM-IBM 72-Pin (92G7204) **$1,059**
32MB 70ns Tall SIMM-IBM 72-Pin (92G7205) **$1,909**

Accelerate your performance . . .

▼ **128KB Write-Thru Cache**[1] (92G7216) **$129**
▼ **256KB Write-Thru Cache**[1] (92G7219) **$249**

And give yourself room to grow.

▼ **16-bit AT Fast SCSI Adapter** (70G8496) **$179**
340MB SCSI-2 Hard Drive (70G8481) **$455**
540MB SCSI-2 Hard Drive (70G8491) **$519**
▼ **270MB IDE Hard Drive** (70G8487) **$245**
▼ **364MB IDE Hard Drive** (70G8488) **$295**
▼ **527MB IDE Hard Drive** (70G8486) **$419**
▼ **728MB IDE Hard Drive** (70G8511) **$579**
▼ **ISA Internal CD-ROM**[2] (70G8501) **$155**
Enhanced SCSI External[2] **CD-ROM** (351075) **$429**
▼ **IBM DualStor 250 Internal Tape Backup Kit for DOS/Windows** (82G7105) **$225***
▼ **IBM DualStor 250 Internal Tape Backup Kit for OS/2** (82G7110) **$225***

Enhanced SCSI
External CD-ROM

Memory upgrades and accelerators may be manufactured in Japan, Italy, Germany, Korea, U.S.A., Ireland or Canada.
[1] Manufactured in Japan.
* Special low price through August 15th.

▼ Indicates an option that can be installed on most systems right at the factory.

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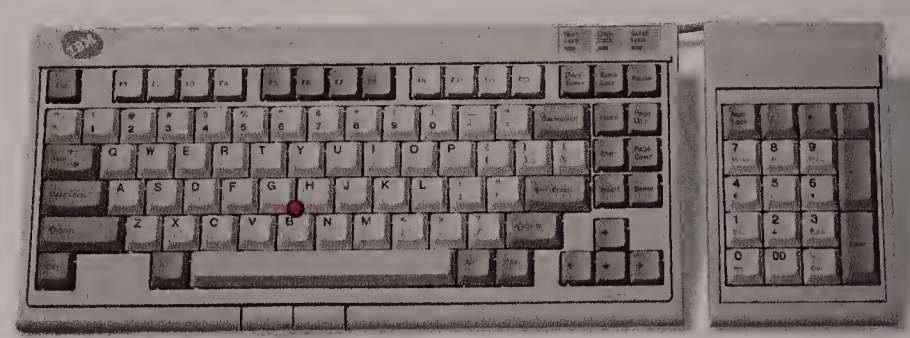

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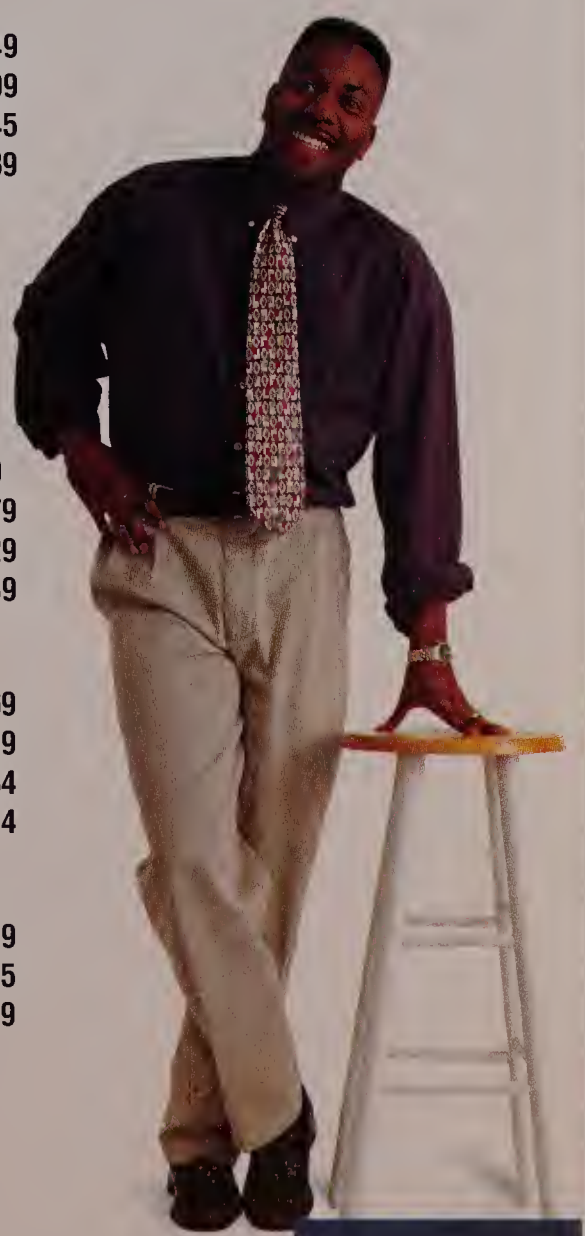

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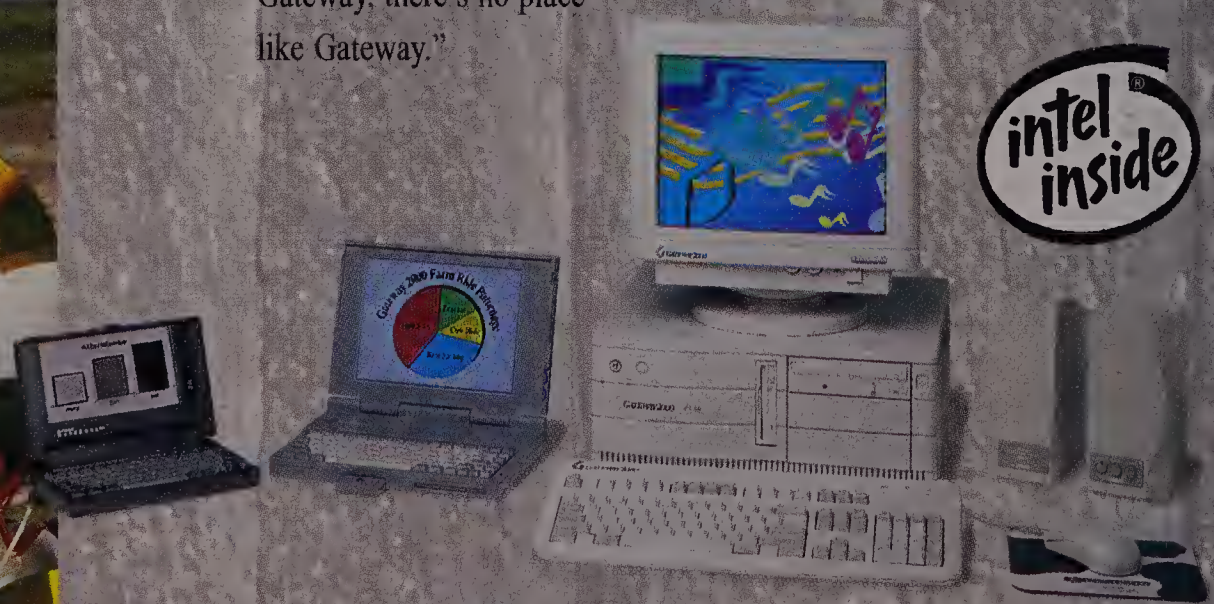

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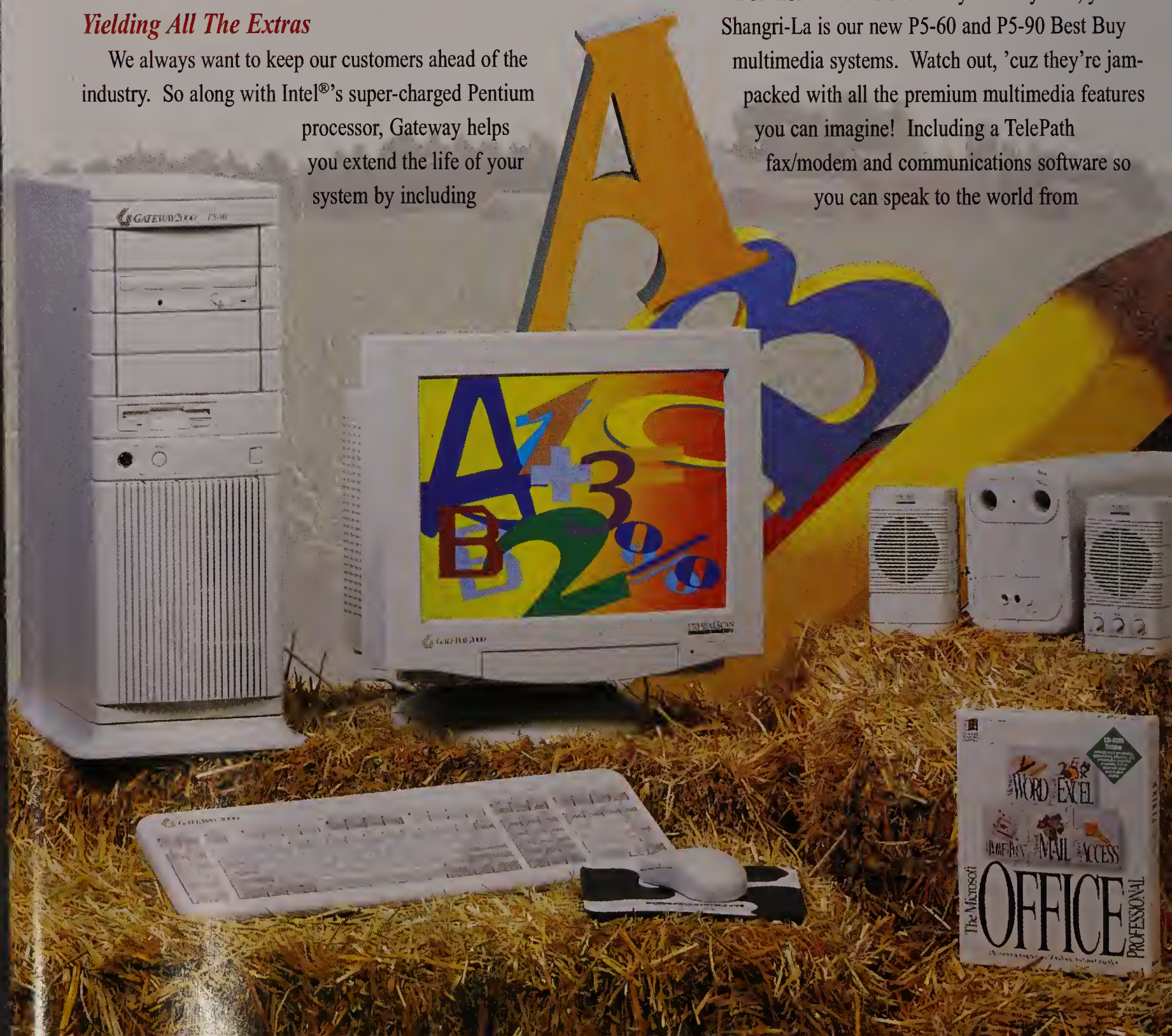

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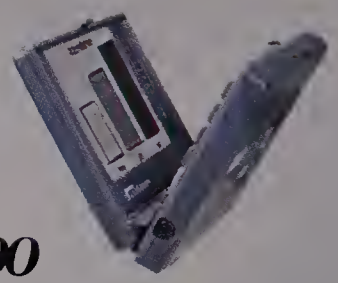

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Upgrade from a 14-inch CrystalScan 1024NI monitor **$395**
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At Long Last, LapLink Comes to Windows

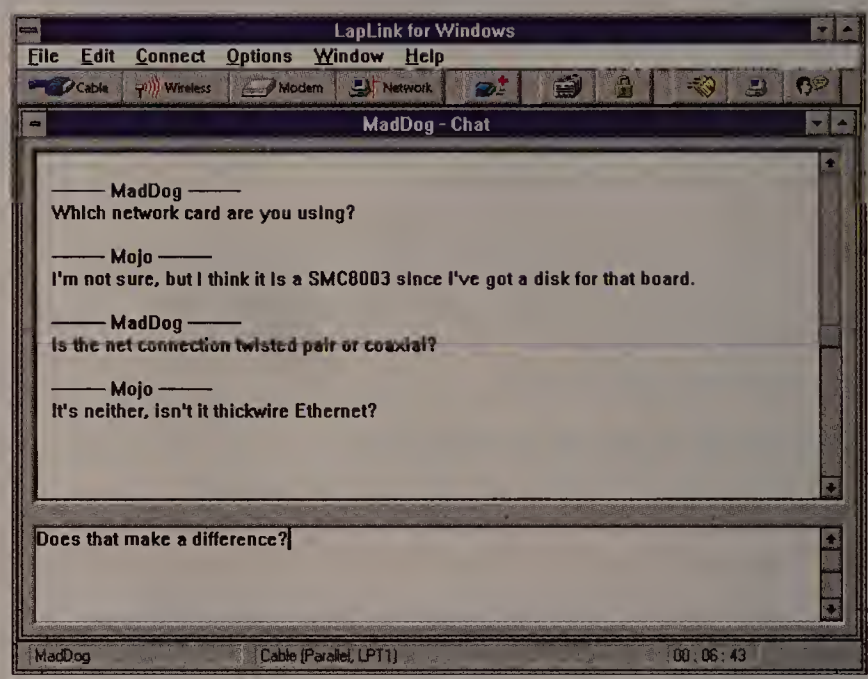
Traveling Software's LapLink, one of the original and best-known file transfer utilities, has finally made its Windows debut. The product incorporates features from preceding DOS versions that let you easily exchange files between notebooks and desktops using either the included serial or parallel cables, a modem, or optional wireless radio devices. This new Windows version adds improved file synchronization, remote-control features, and a chat function for communicating and sending files over a single phone line.

Synchronizing file versions shuttled back and forth between a desktop computer and a notebook has never been quick or painless. To address this problem, Traveling Software has added a SpeedSync feature to accelerate file transfer when updating files. SpeedSync compares the new version to the original and sends only the parts of the file that have changed. A feature called SmartXchange, combining the Refresh and Synchronize functions from the previous LapLink release, makes two directories identical by copying files in both directions.

Remote-control software is handy for tapping into the company LAN or your office PC via modem. Typical uses include exchanging electronic mail or files with office-based associates or running applications not on your notebook. LapLink provides many of the popular features found in other remote-control products.

For example, security options include password protection and *callback verification*, which forces the computer you're dialing to hang up and then call you back at a predetermined number in order to reduce hefty toll charges and prevent unauthorized people from accessing information on your company's network.

The product also addresses a thorny problem facing remote-control users: If your notebook dials into a desktop system that has higher-resolution video, the desktop's display appears too large for your small, low-resolution notebook screen, and you are forced to scroll around to see the other PC's screen. LapLink for Windows resolves video discrepancies by automatically scaling down the larger image so that it fits on your screen.



WE DON'T NEED NO STINKIN' TELEPHONE: LapLink for Windows' chat mode lets two users carry on a conversation while transferring files.

Not Idle Chat

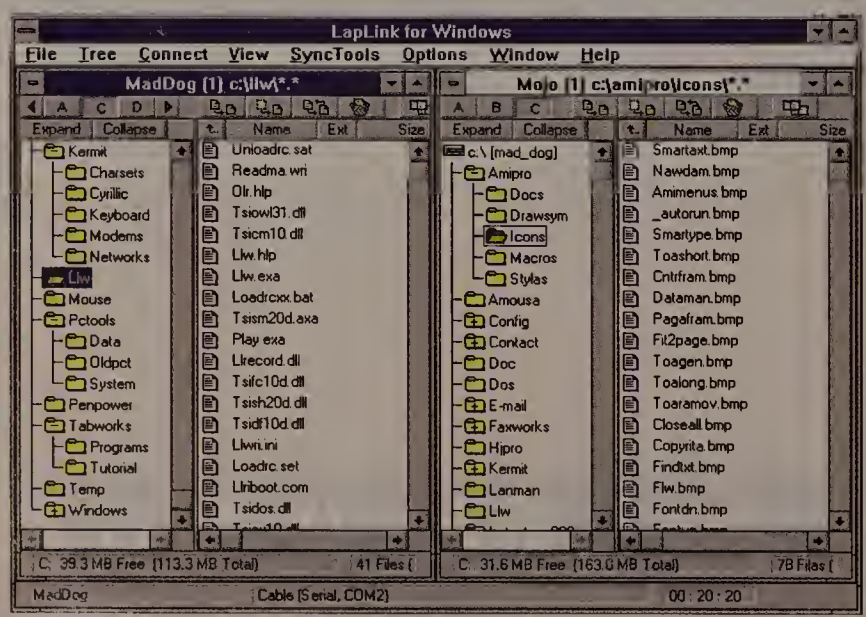
Chat is a small but indispensable feature when, say, you're in a motel room and connected to another system with LapLink for Windows over your only phone line. It's simple and effective: Type a message on one computer, and it shows up in a window on the other system. Chat can be handy when you're helping someone with a computer problem, or when you need to communicate with a colleague at a remote computer. Chat can also be useful for conversing with another user while exchanging files across a phone link.

The beta version was a little rough around the edges. Installation was easy, and the detailed manual will help even the technically challenged through the process. The serial connection worked fine, but getting the parallel connection to work took several calls to technical support and a lot of system mayhem.

With products this feature-packed, sometimes more is less. There are lots of options for port configuration, connections, and security that, while not hard to manage, require your input. For instance, you have to set a dozen different file transfer options, such as whether to confirm file and directory moves or deletes, include files in subdirectories, or transfer existing files. I found weeding through all these options confusing.

Minor annoyances aside, LapLink for Windows is an impressive debut and worth checking out.

—Peter Loshin



LAPLINK FOR WINDOWS retains the program's split-screen interface. The transfer windows are packed with file information.

LapLink for Windows

File transfer utility with remote control and improved file synchronization.

Traveling Software
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Circle 76 on reader service card

Hot New Crosstalk Adds Fax and Internet Capabilities

Remember when data communications packages and fax packages were two completely different kinds of software? In the most recent upgrades to popular communications programs such as Delrina's WinFax Pro and Datastorm Technologies' Procomm Plus, these two categories blur as each borrows features from the other. Now DCA's venerable Crosstalk has joined the trend with Crosstalk 2.2 for Windows. This upgrade adds a fax application, Crossfax, as well as a friendly Internet front end for newcomers to the information superhighway.

Crossfax 2.0 is a stand-alone program that has all the basics for sending and receiving faxes. You can fax from Windows applications by selecting Crossfax's driver instead of your printer driver, or create and send quick one-page faxes from Crossfax.

The program does an excellent job of converting color documents into gray scale, so complex graphics like photographs stand a fighting chance of remaining legible.

Like popular fax products such as WinFax Pro and SofNet's FaxWorks Pro, Crossfax uses OCR to convert received faxes into editable text. But it lacks some of those programs' other advanced capabilities, like extensive tools for designing cover sheets and annotating faxes. Also, there are no provisions for archiving faxes and retrieving them by keyword.

Other than teaming up with Crossfax, Crosstalk has changed little. It still combines an easy-to-use interface and advanced features that made version 2.0 a *PC World* Best Buy. The biggest new feature is the Internet Helper, a tool that couldn't be timelier given the current rush of new users to the Internet.

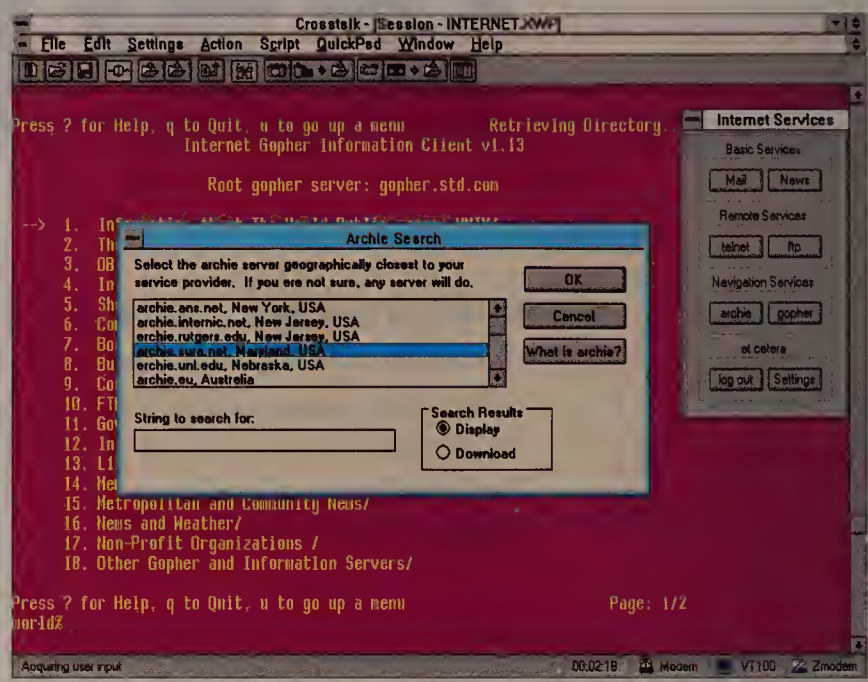
Once you've acquired Internet access through a service provider such as Portal or the World, the Helper lets you roam the Internet without memorizing UNIX keyboard commands. DCA uses Crosstalk's rich customization features, including its scripting language and QuickPad button palettes, to create an attractive point-and-click interface. It won't completely unlock the Internet's mysteries—you still need a vague understanding of terms like *Archie* and *Gopher*—but it's a great time-saver.

Crosstalk and Crossfax can share a single serial port without experiencing the conflicts that some programs create, and special icons let you toggle rapidly between the two applications. They sport different looks, however, with varying approaches to icon design, online help, and other areas. If the inconsistent user interfaces don't faze you, this bundle delivers a solid set of data and fax features at a price only slightly higher than that of Crosstalk alone.

—Harry McCracken

Crosstalk 2.2 for Windows with Crossfax

New fax features and an Internet assistant.
DCA
800/348-3221
List price: $195, upgrade from Crosstalk 2.*x* $45, from competitors $69, Crosstalk without Crossfax $179
Reader service no. 759



ONLINE ASSISTANT: Crosstalk's new Internet Helper makes popular tools like Archie, an Internet search utility, much easier to use.

Fastest PCMCIA Modem—For Now

Microcom's TravelCard Fast 28.8 is one of the first fax-modems to offer 28.8-kilobits-per-second (kbps) performance in a PCMCIA card. The $599 product uses Rockwell International's V.fast class chip set and can communicate at 28.8 kbps with compatible modems. (The modem also supports the international standards used by non–V.fast class modems for communicating at slower speeds.)

Unfortunately, you can't upgrade the TravelCard's flash memory so that the device will be compatible with the pending International Telecommunications Union V.34 standard for 28.8-kbps communications, once it's been ratified. The vendor must do the upgrade, and it will cost $99.

The TravelCard Fast 28.8 fax-modem's Advanced Parallel Technology feature improves data throughput in Windows programs, speeding file transfers, according to Microcom.

The device fits into a PCMCIA Type II or Type III slot. To address the compatibility issues plaguing PCMCIA technology, the TravelCard includes the Point Enabler utility, which should allow the device to work with most notebooks. (A list of compatible notebooks is available from Microcom; check before ordering the product.) The fax-modem has a five-year warranty and includes SofNet's FaxWorks for sending and receiving faxes, a CompuServe starter kit, and an America Online trial membership.

—Randy Ross

TravelCard Fast 28.8

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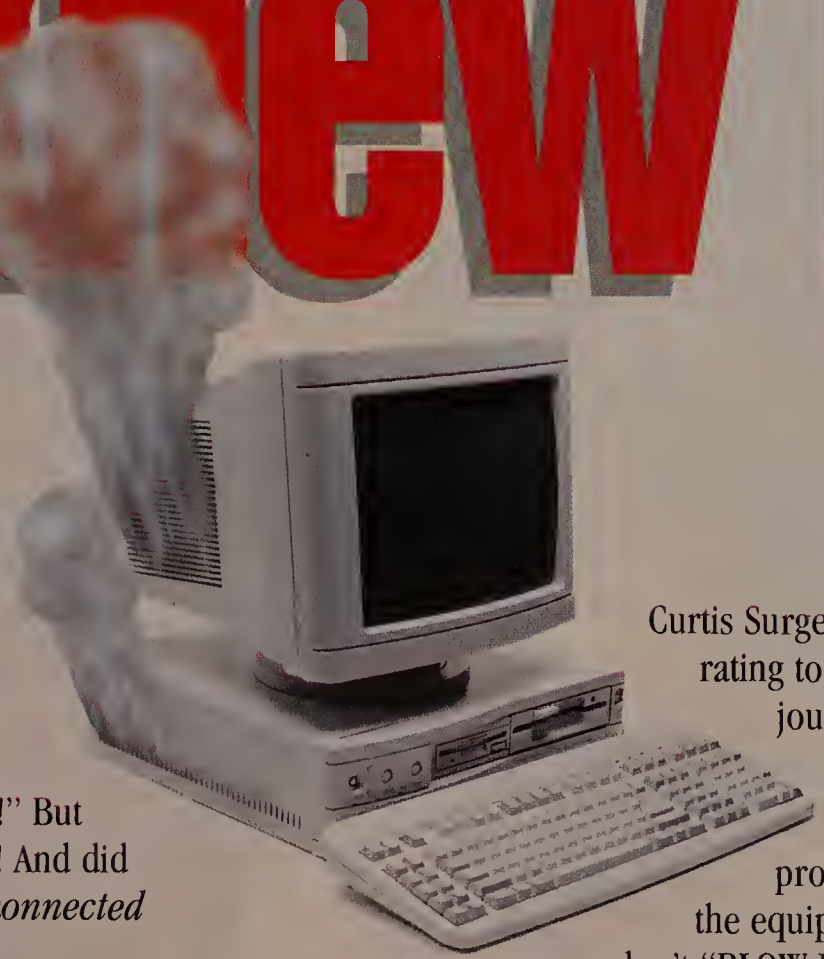
Microcom
800/822-8224
List price: $599
Reader service no. 760

"I knew it. I knew it. I knew it"



I blew it...

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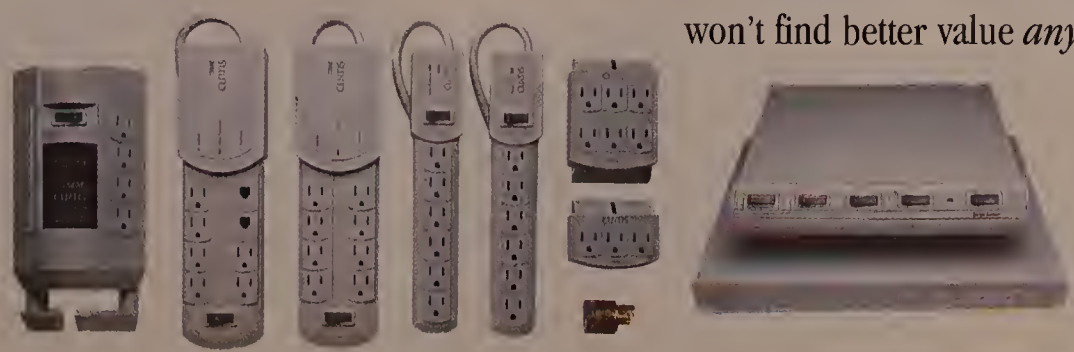

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ooh!

In Rolling Stone's "Hot Stuff" See 8/25/94 issue.

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FlexScan T2-17 Monitor

Nanao doesn't make the cheapest monitors, but it does make some of the best. The new FlexScan T2-17 is an excellent case in point. With an estimated street price in the low $1300s, the T2-17 won't win a price war against the many 17-inch monitors now selling for under $1000. But those less expensive monitors can't compete with the T2-17's image quality or other features. The *T* in the monitor's moniker stands for Trinitron, and you get the nice, bright, sharp picture that Trinitron tubes are known for. The *2* signifies that the T2-17 is the second generation in Nanao's 17-inch Trinitron family, and the monitor sports some extremely cool features. It comes with some of the best-looking on-screen controls we've seen, and the menus are easy to follow, without the crude, Pong-like look you see in other displays. The T2-17 also gives you all the features you'd expect in a high-end monitor, including resolutions up to 1280 by 1024 and high refresh rates. Nanao USA, 800/800-5202.

Reader service no. 747

PhoneBook

At $29, PhoneBook is a great bargain for people who don't want to pay big bucks for a full-fledged personal information manager. Campbell Services' PIM combines a simple interface with a powerful search engine. You don't have to remember someone's full name to find a contact record—just type in the first few letters, and PhoneBook brings up a list of possible entries. The program's Alias feature helps you get a grip on nicknames: Search for *Elizabeth*, for example, and PhoneBook also finds all entries containing the names *Betsy* and *Liz*. Since PhoneBook supports OLE 2.0, you can attach an OLE object, like a document, to a contact record. Campbell Services, 800/345-6747.

Reader service no. 748

Monarch for Windows

If you get mainframe reports delivered to your PC as ASCII text, Personics's Monarch for Windows lets you query, cross-tabulate, and even drop the data into a spreadsheet or database. You teach Monarch how a report is laid out by showing it the combinations of characters and spaces that separate fields and records. The program then parses the report into useful data. (If you later get an updated version of the report, Monarch can parse it again without additional training.) You can set filters, add calculated fields, sort data, and even create summary reports using cross-tabs. While Monarch's own reporting capabilities are limited, it can export data to dBASE, Paradox, Excel, and 1-2-3—allowing you to work with the data in just about any program. Monarch lists for $499 and sells for about $330 on the street. Personics, 800/445-3311, 508/658-0040.

Reader service no. 749

After Dark 3.0

Ditch your work and sing along: "Flying out of the sun, the smell of toast is in the air. When there's a job to be done, the flying toasters will be there." In After Dark 3.0, the latest screen saver collection from Berkeley Systems, the toasters don't just fly—they invite you to sing along, karaoke-style, to "On Mighty Toaster Wings." Among After Dark's 30 screen savers you'll find schools of fish, artistic patterns, and games with wild sound effects. In Rat Race you pick the winner from a field of running rodents. The Draw-Morph tool lets you create your own screen saver by drawing pictures and morphing them. The $49.95 After Dark 3.0 also can shut down Energy Star–compliant monitors after a chosen period of time. Berkeley Systems, 510/540-5535.

Reader service no. 750

RAT RACE: After Dark 3.0's collection of wacky screen savers includes racing rodents and singing toasters.

Umax Vista-S6 Color Scanner

The scanner used to be an esoteric peripheral for those with deep pockets and specialized needs. But times change. Umax's Vista-S6 is a TWAIN-compliant, full-color flatbed scanner that comes with all the bells and whistles you'd expect—and an attractive price tag. Using a standard SCSI-2 interface, the Vista-S6 offers 24-bit scanning at 600-by-300-dpi resolution. With the bundled UltraView utility, the scanner uses software interpolation to scan images at 1200 by 1200 dpi. The Vista-S6 is available in two versions: For $945, the product comes with Adobe Photoshop LE and Caere's OmniPage Direct OCR software; for $1045, you get the full version of the Adobe Photoshop package and Kai's Power Tools. Umax Technologies, 800/562-0311, 510/651-8883.

Reader service no. 751

Medical HouseCall

Medical experts agree that we should all be active partners in our own health care. Applied Medical Informatics's $99.95 Medical HouseCall can help you achieve that goal. If you or a family member shows signs of illness, HouseCall suggests possible causes and remedies, based on questions it asks to determine the symptoms. Tell the program the medications you're taking, and it warns you about side effects and potentially dangerous combinations of drugs. Other features include a medical database that lets you maintain records for each member of the family, and an illustrated encyclopedia that provides information on diseases, poisons, and other health-related topics. Applied Medical Informatics, 800/584-3060.

Reader service no. 752

THE FIRST RULE OF WINDOWS IS REAL ESTATE, REAL ESTATE, REAL ESTATE.

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Circle 255 on reader service card

CompuSet MH-07 Modem Headset

Many people who spend a lot of time on the phone use a headset rather than a traditional handset, but these earphone-and-microphone devices can be bulky and uncomfortable. Plantronics's $99 CompuSet MH-07, however, is a headset with an extremely small size and light weight that may surprise you. Designed to connect between a PC and a modem, the CompuSet includes a tiny bud that fits into either ear, and a microphone mounted on a 3-inch boom. Once you dial a phone number from your PC (using modem-dialing software), you can talk on the phone while leaving both hands free for other work. The unit comes with six interchangeable ear buds for different ear types, volume-control dialing, a quick-disconnect cord (useful for putting a call on hold), and a clip to fasten the cord to your clothing. Plantronics, 800/544-4660, 408/426-5858.

Reader service no. 753

First St.

Mapping software is useless without the data to provide context. But the requisite add-ons, such as census records, street maps, and demographics, can be complex. First St. to the rescue. A joint release from data distributor Wessex and Environmental Systems Research Institute, First St. bundles ArcView 2.0 (a mapping program) and 22 CD-ROMs of U.S. geographic and demographic information. The $1995 package works like this: ArcView plots points on a map that correspond to addresses in your database; the accompanying census-data filters target income levels, age ranges, or ZIP codes. You can also use ArcView to map a potential retail site and overlay information for a three-dimensional analysis. ArcView's maps make great presentation tools, too. First St. is compatible with 1-2-3 and Excel. Wessex, Inc., 800/892-6906, 708/501-3662.

Reader service no. 754

VisualCADD

Numera Software hopes to capture the low-end computer-aided design (CAD) market with its new VisualCADD software for Windows. While this package picks up where the defunct Generic CADD left off, it goes beyond the low price and easy two-key commands of its once-popular DOS predecessor. VisualCADD provides you with a full suite of two-dimensional CAD functions, and it adds OLE 2.0 support for sharing data and graphics with other Windows applications—a boon for those who use CAD data for proposals and reports. VisualCADD can read and write both Generic CADD and AutoCAD files, and power users can customize the application using Microsoft's Visual Basic and other standard programming languages. VisualCADD lists for $495. Numera Software Corp., 206/622-2233.

Reader service no. 755

Wildcat 4.0

Planning to build your own bulletin board system? Mustang Software's major rehaul of its popular Wildcat BBS software can help. Version 4.0 features a new image view that allows your BBS subscribers to preview a GIF image before they decide whether to download the full image. A new chat feature lets your subscribers have real-time conversations with each other online. In addition, Wildcat now supports modems with speeds of up to 28.8 kilobits per second, and the program now allows end users to create longer messages—up to 64K—and to check their spelling as well. It costs $50 to upgrade from previous versions of Wildcat; start-up costs for a bulletin board system typically range from $129 to $799, depending on the number of telephone lines that you need. Mustang Software, 800/999-9619, 805/873-2500.

Reader service no. 843

PAINTER 3.0's new drawer menus, page rotation, and color wheel make it easier to use advanced tools such as the Image Hose brush.

3M Go-Anywhere Disk

Build a better floppy, and the world will beat a path to your door. That's what 3M is banking on as it offers its first floppy upgrade since the 1.44MB disk was introduced in 1987. To ward off dust particles, 3M's new floppy reduces static buildup by 40 percent, according to the company. The Go-Anywhere also decreases friction—and the torque needed to spin the disk in the drive—by 20 percent. 3M says the new disks should last longer and use less notebook battery power. They cost $15.89 for a box of ten. 3M, 800/888-1889 ext. 250.

Painter 3.0 for Windows

Sporting more than 50 new features, Fractal Design's Painter 3.0 lets you create stunning images. Its new drawer-based interface, borrowed from the company's Dabbler, makes it easier to find the program's many powerful tools. Painter 3.0 includes Fractal's object layering feature, which lets you rearrange several "floating" image elements without having to paste them to the background. What really pops the lid off the $499 Painter is its ability to record and apply special effects to AVI or QuickTime movies. And the unique Image Hose does amazing effects. For instance, it can write a name using photorealistic images: You could create an AVI clip that shows a whirlwind of leaves magically spelling out your company name. Fractal Design, 800/297-2665, 408/688-8800.

Reader service no. 757

For more information about any product, contact the manufacturer or circle the number on the reader service card.

Revolutionizing an industry happens once in a lifetime. Okay, maybe twice.

When the world asked for color, Canon responded with the revolutionary Color Laser Copier. Now Canon is answering today's color needs with a visionary new generation of color solutions, the Canon Color Laser Copier 800 and 700.

This new breed of copiers produces images so sharp, so vivid, they're virtually indistinguishable from the original. And Canon's new copiers are highly productive, too.

They make a swift seven full-color copies per minute on a variety of materials including card stock. Auto-feed OHP transparencies efficiently by cassette. Make multi-page documents effortlessly with the optional Recirculating Document Feeder and Sorter. And the Color Laser Copier 800 is the first color copier ever to offer *Auto Duplexing* for automatic two-sided copies.

You can also transform these new color copiers into ultrafast, full-color, plain paper printers with optional print controllers and Intelligent Processing Units (IPUs), so you can make brilliant color output directly from your computer or network.

For a free *Color Solutions Guide* that will tell you more about the new Canon Color Laser Copier 800 and 700, as well as the rest of our color copier line, call 1-800-OK-CANON. When the rest say you can't, Canon says you can.

NOW YOU CAN

Canon

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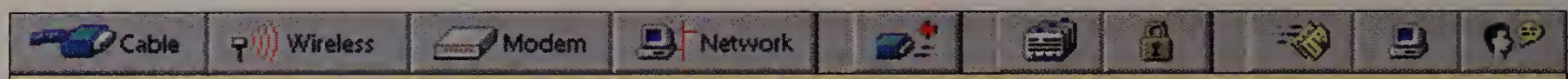
Circle 50 on reader service card



NOW THERE'S A WAY TO TRANSFER FILES THAT RUNS LAPS AROUND LAPLINK.

Are you one of the millions of mobile computing types who are happily running LapLink®?

Well, get ready to move over.

If anyone can take the effort out of remote control, it's Traveling Software.

Because now the world's favorite file transfer package is even faster, even more reliable and, get this, even integrates remote control.

What's that, you say? Remote control and easy-to-use don't happen in the same box?

You'd better look at this one.

Our new graphical interface takes shameless advantage of Windows,™ with push-button toolbars – like the handy LinkBar™ you see at the top of this page – drag and drop functionality and plenty of online HELP.

Which is something you'll need very little of when you're using remote control to run applications and access files and resources back at the office.

If you like being productive, you'll love how LapLink for Windows – and *only* LapLink for Windows – lets you transfer files in one window while you use remote control to, say, read your e-mail in another.

But you'd better read fast, because our ingenious new SpeedSync™ transfers only the bytes you've changed, cutting your transfer time – and your phone bills – by up to 80%.

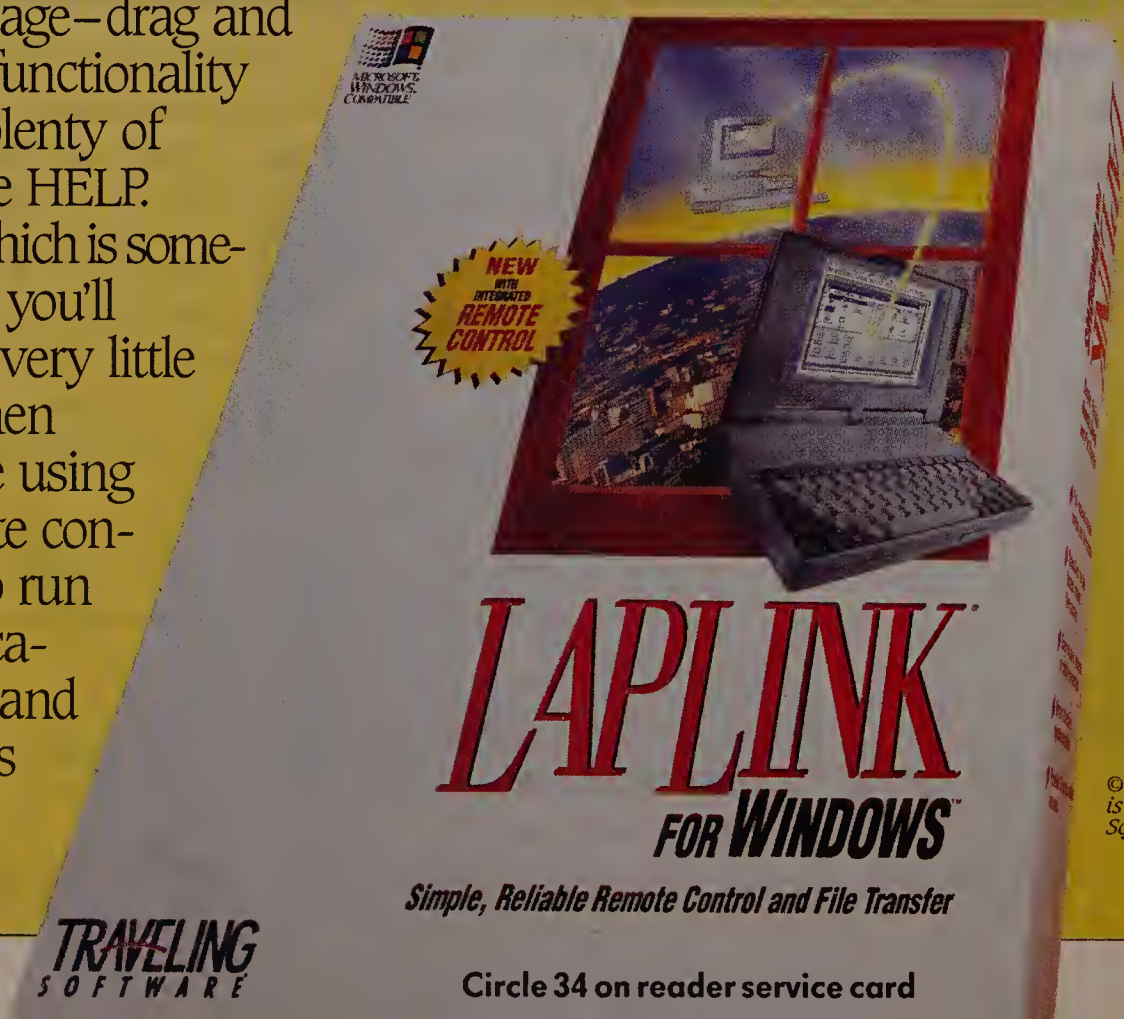
See your nearest reseller.

Or call us at **1-800-487-4304**.

We'll tell you all about our new security features, NetWare® support, extensive modem and PCMCIA support and, best of all, our irresistible upgrade offer.

We'll even send you a free demo disk.

So you can watch us do our laps.



TRAVELING SOFTWARE

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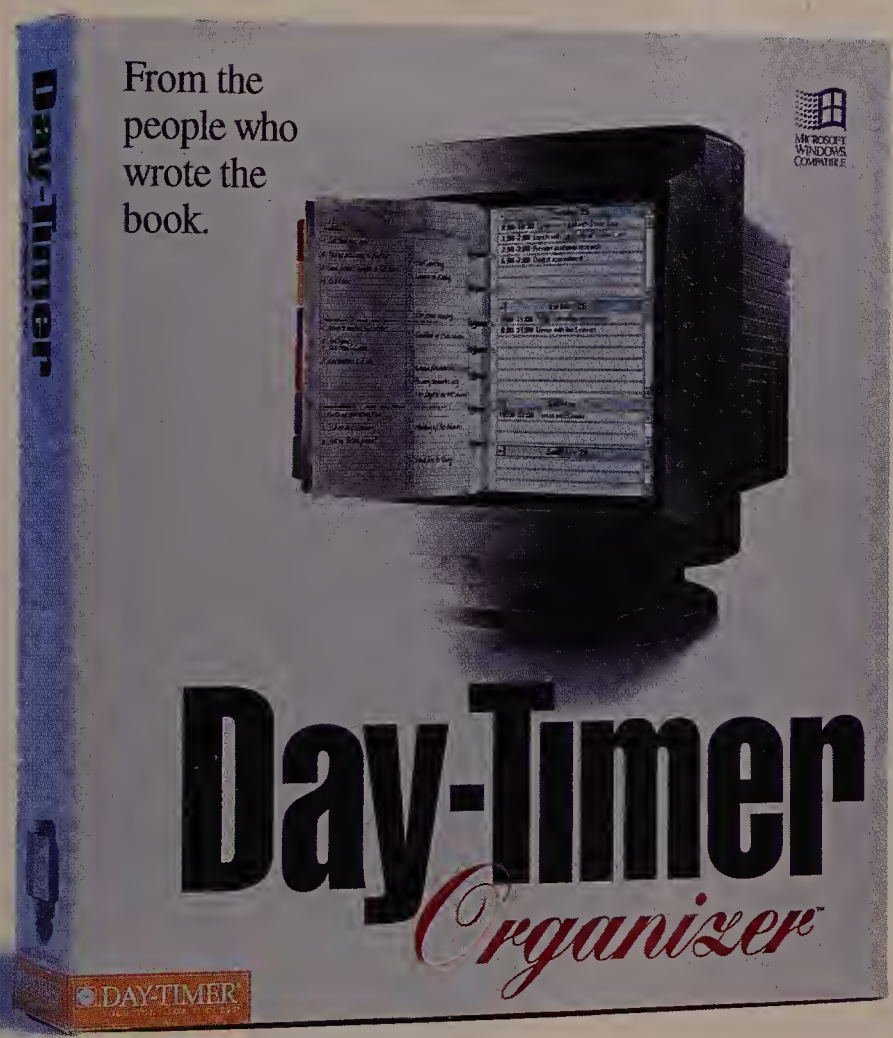
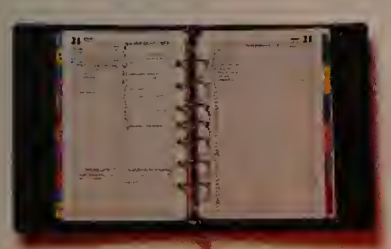
Circle 34 on reader service card

Only One Company Could Fit 47 Years Of Time Management Experience On A Disk.



The people who elevated time management to an art form, announce Day-Timer Organizer™— software that integrates a calender, address book, to-do lists, notebook and expense tracker in one easily accessible place. Start it up and you'll immediately notice a striking resemblance to your daily planner, with its clear and familiar layout. Look a little closer and discover how the power of a computer lets you instantly retrieve and sort information. Of course, there are times when you're nowhere near your desktop but still need to keep information at hand. No problem. Day-Timer Organizer lets you print lists, schedules—anything you need— in formats that fit most planners. To learn more, see your favorite software retailer, or call 1-800-859-6955 and mention key #142175. Available in Windows, DOS or Network versions.



DAY-TIMER® TECHNOLOGIES

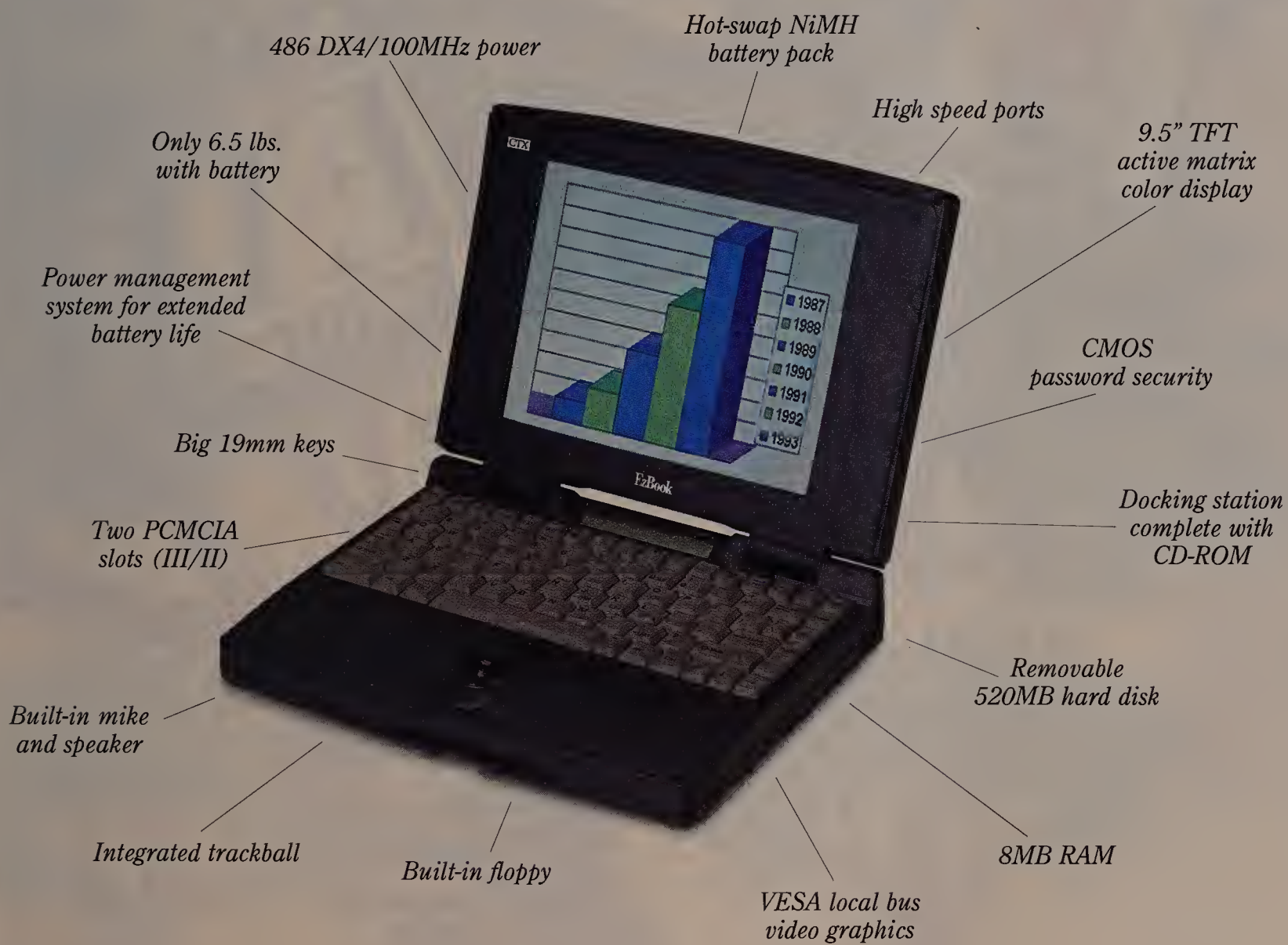
Day-Timer Organizer is a trademark of Day-Timers, Inc. © 1994 Day-Timer Technologies, 2855 Campus Drive, San Mateo, CA 94403

Circle 17 on reader service card

PC Magazine's Idea of the "Perfect Notebook."

Reprinted from "*PC* MAGAZINE," July, 1994 Copyright © 1994 Ziff-Davis Publishing Company L.P.

CTX Introduces the Better-Than-Perfect Notebook.



Once again, CTX brings you more for less.

Introducing EzBook™, a powerful 486 notebook computer with all the great features PC Magazine calls for in its ideal, *hypothetical* notebook PC. And more.

More 486 DX4 power (100MHz) and 60 percent more disk capacity (520MB).

What's more, this better-than-perfect notebook is real and available now. And you can get one with its optional docking station complete with CD-ROM drive already built in for about the same low street price of $4500.

But if you're willing to settle for just a "perfect" EzBook notebook (PC Magazine's configuration), we can save you somewhere around $1000.

Or, if you want to save even more and be just slightly imperfect, get our economy EzBook with a monochrome or dual-scan screen, 4MB of RAM, a 260 MB disk, and no docking station for as low as $1549. You save nearly $3000.

More for less. That's just what we've been offering in color monitors for years. And now we outsell all the names you know best — like Sony, NEC, Mitsubishi, Samsung, and IBM.*

Who knows how successful CTX notebooks will be? But better-than-perfect isn't a bad place to start. Call 1-800-888-9052 ext. 201 for more information on where you can get the real, ideal notebook.

CTX

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Circle 74 on reader service card

WordPerfect®
Main Street.™
Bringing the best home.
LetterPerfect
DOS Version 1.0
E
EDITOR
FOR WINDOWS
KINGCOM
Compatible Windows
Software
Data
Communications
ECLIPSE
FAX™
WITH OCR
Close your checkbook! Put away your credit card! Here's our second annual guide to software you can buy with petty cash.

SUPER SOFTWARE BARGAINS

50 FOR $50 OR LESS

The bad news is that full-scale, feature-rich business applications usually cost hundreds of dollars a pop. The good news is that a lot of terrific programs are out there at a fraction of that cost. And we're not talking about games and screen savers, either. These are real productivity tools that can help you get a day's work done—communications programs, desktop publishers, personal information managers—plus add-ons and utilities to plug the holes found in more expensive tools. And let's not forget a February *PC World* Best Buy, Quattro Pro 5.0 for Windows—at $49, one of the finest spreadsheets available for any price.

To find the best software under $50, we stalked the aisles of CompUSA, Egghead, Babbages, Office Depot, Price/Costco, Computer City, and other retailers. We waded through catalogs and mail-order ads, scouring near-microscopic type until our eyes watered. We jacked into BBS lines, online services, and the home-office grapevine, searching for bargain shareware and elusive freeware. We sacrificed the integrity of our WIN.INI and SYSTEM.INI files and threw AUTOEXEC.BAT and CONFIG.SYS to the wolves. And in the end, we prevailed.

In this article you'll find handpicked bargains. We included some programs with list prices greater than $50, but only if we found them selling for less at three or more stores or mail-order houses. So dig in. The programs we uncovered prove you don't have to spend big bucks to get big results.

By Steve Bass and Peter Scisco

ILLUSTRATIONS BY DAVID GOLDIN

CHEAP CONNECTIONS: E-Mail Connection manages your various E-mail addresses, sending incoming mail to the right folder automatically.

Communications

E-Mail Connection

I'm on more E-mail services than Ben & Jerry's has flavors, and each one has its own front-end program to clog up my hard disk. But I've scooped out a solution with E-Mail Connection. This handy Windows program sends and receives electronic mail from MCI Mail, CompuServe, and Prodigy. The program also handles applications that comply with Microsoft's MAPI E-mail standard, and supports Motorola NewsCard and NetWare MHS. And it saves me money: If someone sends me a message on MCI, E-Mail Connection routes my response through Prodigy and the Internet if the rates are cheaper that way. I'm also able to schedule events, address mail without trying to understand the many confusing E-mail formats, and sort incoming messages automatically into folders. Watch for America Online and direct Internet links by the time you read this. E-Mail Connection lists for $49.95. ConnectSoft, 206/881-8251, 800/234-9497 (fax). —*S. B.*

Reader service no. 700

Eclipse Fax 6.0

If you have a fax-modem and are ready to sign on, try using Eclipse Fax 6.0 to send, receive, and manage your faxes. It handles incoming and outgoing faxes with aplomb, matching them to the names in your phone book. For instance, I use it to time-stamp, scan, and file to a specific directory any fax from a public relations firm, as well as hold outgoing faxes to distant friends until off-peak hours. You could even have it delete any fax from, say, your attorney. Eclipse Fax 6.0 lists for $84.95, but I've seen it discounted as low as $49.95. Phoenix Technologies, 800/452-0120. —*S. B.*

Reader service no. 701

KingCom 2.0

My computer gets so many COM-port conflicts that I've thought about sending it to a psychologist, but I know I'll get better results from KingCom, The Windows Com Port Manager. KingCom handles all my fax and data traffic and resolves conflicts when more than one application tries to access the same communications hardware. I can manage up to nine applications and define rules for how my hardware responds to my data and communication programs. And there's no downtime while my modem sits on a couch. KingCom retails for $49.95. E-Ware, 800/892-9950, 714/236-1390 (fax). —*S. B.*

Reader service no. 702

WinModem 4.0

✔SHAREWARE Ever wonder whether your internal modem is working? For a ten-dollar bill, you can put that information icon on your screen. WinModem looks like an external modem's front panel, complete with diodes twinkling on and off—and it

SHAREWARE ON CD-ROM

There's a new way to acquire shareware: collections on CD-ROM. These compilations are as diverse as they are massive—ranging from shareware designed for programmers to fonts, clip art, and games. My favorite shareware CD-ROM is Software Vault: The Emerald Collection. Not only is the selection diverse and current, but it offers two slick interfaces—DOS and Windows—to help you choose programs. Taking a different tack, CompuServeCD contains no shareware; it's a catalog of nearly every program available online. Tag a file, and the program logs on to CompuServe and downloads it.

More shareware CD-ROMs are available than we can list, but here are the best we've seen. Remember, though: Buying a CD collection doesn't mean you've paid for the shareware. If you continue to use a program, you must send in the registration fee. —*S.B.*

ASP Advantage
$24.95
Association of Shareware Professionals
616/788-5131, 616/788-2765 (fax)
Reader service no. 743

CDRP
$39.95
Shareware Overload Trio
617/494-5330, 617/494-6094 (fax)
Reader service no. 744

CompuServeCD
$7.95 per disk
CompuServe Information Service
800/848-8199
Reader service no. 742

Shareware Explorer Volume 1-4
$49.95
New Frontiers CD-ROMs
203/738-7667, 203/379-4184 (fax)
Reader service no. 746

Software Vault: The Emerald Collection
$49.95
ADC
800/775-4232, 918/742-2022, 918/742-8146 (fax).
Reader service no. 741

Windows Shareware Gold
$24.95
Digital Publishing Company
800/279-6099, 612/531-9812 (fax)
Reader service no. 745

lets you know instantly when you're online and whether the modem is sending or receiving. Available as WNMDM4.ZIP on PC World Online and other online services. Information Technology, CompuServe ID 70166,1152. —*S. B.*

Reader service no. 703

Data Management

AceFile

AceFile has what most people need in a Windows database program: network support, flat-file capabilities, business templates, snazzy two- and three-dimensional graphs and charts, DDE and Clipboard talents, and mail merge and label skills, to name just a few features. And while not truly relational, AceFile can join two files to make a third. It uses dBASE-compatible files and can import and export data from 1-2-3, Symphony, and ASCII files. The program also has a macro language and recorder, a report designer, and a built-in phone dialer. AceFile lists for $129, but I've seen it on sale for as little as $49. Ace Software, 408/232-0300, 408/232-0305 (fax). —*S. B.*

Reader service no. 704

Ad Hoc Database Manager

✓SHAREWARE Okay, so you're not sure if you even *need* a Windows database—never mind shelling out any dinero to try one. For the price of a download, you can give this surprisingly nimble relational database manager a whirl. It took me less than five minutes to design a data entry form with the help of Ad Hoc's handy lookup tables, links to other databases, and fast search capabilities. Once I was in the table, a quick click of the right mouse button gave me access to the most common navigational tools, including those with the ability to modify the layout. It's available as ADHOC.ZIP on PC World Online and other information services; the registration fee is $49.95. ExLogica, CompuServe ID 75136,1033; 303/933-8553 (fax). —*S. B.*

Reader service no. 705

FREE

FreeZip 1.12

True or false? You need to buy a user-friendly Windows program to manage your zipped (compressed) files. False, because FreeZip does the job—quickly, efficiently, and for free. FreeZip not only zips and unzips files in the background, but it lets you view the contents of zipped files, test the files' integrity, and recursively create directories in zipped files. Not bad for a freebie, even if it does require you to have PKZip on your system. Available as FREEZIP.ZIP on PC World Online and other online services. —*S.B.*

Fonts

FontMinder 2.0

Last week you purchased one of those massive collections of fonts on CD-ROM and installed 1000 fonts into Windows. But now you can't seem to remember what the difference is between Bodoni Bold and Bazooka Black. Besides, all those new fonts grab your system resources like a Hoover sucks dust. FontMinder 2.0 from Ares Software cleans up TrueType and PostScript Type 1 font collections (it supports ATM 2.5) and sweeps them into a slick control box from which you can install, uninstall, delete, print, archive, and preview them. The program's Font Packs are especially noteworthy, letting you arrange your fonts into groups and assign them to specific documents. That way, you only have to run with the fonts you need for a particular job. FontMinder's suggested list price is $80, but I've spotted it on a few occasions for a meager $49. Ares Software, 415/578-9090, 415/378-8999 (fax). —*P. S.*

Reader service no. 706

Type Twister 1.0

Any designer worth an X-Acto blade knows how to use type as art—twisting, turning, and reshaping it for effect. By letting you tap into some of that knowledge, Type Twister gives you a new way to shape your words. Its 50 built-in designs come with effects, color schemes, and fonts carefully selected for visual appeal. When you're satisfied with a design, copy it to the Clipboard and paste it into your Windows word processor. Type Twister is an OLE 1.0 server, so you can insert its designs into any OLE 1.0 client, and it supports TrueType and PostScript fonts. Forget big, bold, and clunky—use Type Twister to add visual spice to brochures, mailings, presentations, and more. It lists for $49.95. Aldus Corp., 800/888-6293, 619/558-6000. —*P. S.*

Reader service no. 707

WANT EYE-CATCHING TYPE EFFECTS? They're easy to get when you combine Type Twister with your Windows word processor.

Job Search and Training

PFS: Resume and Job Search

If you're looking for a job, you probably don't have a lot of money to burn. For about $32 on the street, PFS: Resume and Job Search can help you create your résumé by choosing from business, academic, technical, and recent-graduate templates, and filling in your characteristics with the built-in Windows word processor. It's then a simple matter to select a few action words from a glossary to spice it up, use the spelling checker to catch typos, and, with a single mouse click, print your brand-new résumé. And the Job Search Manager reminds you of important calls, mail merges records into follow-up letters, and provides reminders so you'll never forget appointments. The program lists for $79.95, with a street price under $40. SoftKey, 617/494-1200, 617/494-1219 (fax). —*S. B.*

Reader service no. 708

Professor Office

By far the best—and unfortunately

FREE

WinClock 2.0

The clock in Windows gets in the way, but WinClock 2.0 is so unobtrusive that it can stay on the screen all day and you won't even notice it—until you want to. Better yet, it monitors system resources and warns you if you drop below the 25 percent mark. At no cost, WinClock tells you the time, saves screen space, and keeps Windows crashes down to a level of mild annoyance. Available as WINCLOCK.ZIP on PC World Online and other online services. —*P.S.*

FREE

Shareware Reference Guide: Windows Edition
Want to see what's hot on the shareware scene? Start with the Shareware Reference Guide, a thorough catalog in the form of a Windows Help file. If you need a certain type of shareware and can't find it in this article, check the Shareware Reference Guide. It's free for the asking and available as SRGWN.ZIP on PC World Online and other online services. *—S. B.*

the most expensive—way to learn an app is with a real live tutor. If you can't afford such a luxury, you can always purchase a professor for just under $50. Professor Office quickly brings you up to speed in Microsoft Word 6.0 for Windows and Excel 5.0. You'll get the inside scoop on how to take advantage of such Word for Windows features as templates, graphics, and printing, plus tips on using Excel charts and functions efficiently. As a bonus, Professor Office is bundled with AnyTime, a handy personal information manager. List price is $49.95. Individual Software, 800/822-3522. *—S. B.*

Reader service no. 709

WinWay Job Interview for Windows

MULTIMEDIA Here's a quiz: What's worse than an IRS audit and more stressful than a visit to the dentist? Answer: a job interview. To make the process easier, WinWay Job Interview for Windows uses disembodied male and female interviewers who fire off tough questions, giving you a chance to practice bright and articulate answers. The program takes you through more than 18 categories of questions and offers an array of appropriate responses. Job Interview can use your computer's built-in speaker, but to get really authentic voices—as well as sweaty palms—you'll need a sound card and real speakers. The list price is $69.95, but I've seen the program selling for just under $50. WinWay Corp., 800/494-6929, 916/965-7878. *—S. B.*

Reader service no. 710

FREE

What Happened
It happens to me, to you, and probably to Bill Gates: Windows crashes. Figuring out why isn't always easy. That's why What Happened is so useful. The program monitors the resources you choose and logs them to disk at any interval you want. This process gives you a snapshot of what's happening in your system, helping you analyze potential problems. Available as WHAT10.ZIP on PC World Online and other online services. *—S. B.*

Office and Legal Documents

Descriptions Now 2.0

Managing people taught me one thing: Always make sure your workers know exactly what their jobs are and how to get them done. That means having solid job descriptions for each position—and that's where Descriptions Now saves the day. This DOS program includes a library of 2500 job descriptions that you can edit to suit your specific needs. Just fill out dialog boxes or select buttons to enter salary, supervisor, job code, education level, and other information. You can even cut and paste duties from one library entry to another to build customized descriptions. There's no law saying that your company needs written job descriptions, but they can help should a dispute arise. Descriptions Now 2.0 lists for $149, but it's commonly priced around $50. KnowledgePoint, 800/727-1133, 707/762-0333.*—P. S.*

Reader service no. 711

FREE

SetTime 1.1
Does anybody really know what time it is? Does anybody really care? I do, so every few weeks I use SetTime to dial my modem into the National Institute of Standards and Technology's atomic clock in Boulder, Colorado. In less than a ticktock, the program sets my computer's clock with atomic accuracy. Then it's up to my CMOS battery to let the clock get behind again. SetTime is available as SETTM1.ZIP on PC World Online and other online services. *—S. B.*

It's Legal 5.0

If you want to cover all your legal bases, try the latest version of this popular Windows barrister. The fill-in-the-blank forms are incredibly easy to use, and the CD-ROM leads you through an interview for all of the documents except a few planning worksheets. You can also export the forms as ASCII files for editing in a word processor. The program now covers prenuptial agreements and offers a business planning worksheet, help for home buyers, and a memorial service worksheet (without the Kevorkian clause). As a bonus, the CD-ROM version includes a layman's law dictionary that explains legal terms in plain language. When the going gets tricky, It's Legal suggests contacting a lawyer. But for relatively simple contracts, offers of employment, personal legal affairs, and consulting agreements, the billable hours that you get from this program make its $49 list price clearly an open-and-shut case. Parsons Technology, 800/223-6925, 319/395-9626, 319/395-0217 (fax). *—P. S.*

Reader service no. 712

Personal Finance

Microsoft Money 3.0

I'm off to see the wizards—Money's financial Wizards, that is. They help me calculate savings goals, plan my retirement, compare loan rates, analyze mortgage scenarios, and take care of many more financial tasks. Electronic bill paying, banking, and investing also figure in the latest improvements to this Quicken wanna-be. Money 3.0 isn't as full-featured as Quicken 3.0, and its modemed electronic features cost extra (three different services, ranging from $3.95 to $17.95 per month), but the program gives its biggest rival a run for the money. This Windows package is easy on the wallet too, selling for just $25 to $30. Microsoft, 800/426-9400, 206/882-8080. *—P. S.*

Reader service no. 714

One-Write Plus 4.0

You may never need a bookkeeper if you use this sophisticated DOS-based business finance program. One-Write Plus handles customers and invoicing, vendors and purchasing, payroll, and inventory. It tracks as many as 1000 general ledger accounts on a cash or accrual basis. Comprehensive reporting for accounts, customers, vendors, and payroll takes just a few keystrokes. And

OS/2 ON A BUDGET

Everyone loves a bargain, and OS/2 aficionados are no exception. Here are five of my favorite OS/2 programs you can buy for under $50. —*Lou Miranda*

BackMaster 1.1

If you just got a new tape drive and need some good, inexpensive backup software, try MSR's BackMaster. It supports all QIC-compatible drives and has an easy-to-use Presentation Manager interface (but alas, not one that takes advantage of the Workplace Shell). It works in the background, handles Extended Attributes and both FAT and HPFS partitions without a hitch, and can even restore OS/2 if your hard disk goes south. BackMaster lists for $79.95, but I've seen it for $49.95. MSR Development, 409/564-1862, 409/560-5970 (BBS), 409/560-5868 (fax).

Reader service no. 736

DeskMan/2

Want to customize your desktop? DeskMan/2 lets you do it in spades. You can password-protect folders, remove items from pop-up menus (don't you just hate that pesky Arrange item on the desktop menu?), and outlaw drag-and-drop to keep others from altering your desktop. DeskMan is also a complete Workplace Shell backup program, allowing you to restore your setup after a crash or copy it to another computer. And DeskMan even comes with a utility for running multiple virtual screens. The list price is $49.95. Development Technologies, 803/790-9230, 803/738-0218 (fax).

Reader service no. 737

Directory Manager/2

✔SHAREWARE Do you find OS/2's Drive objects slow and a tad clumsy? Directory Manager/2 is like Windows' File Manager on steroids. You can drag and drop files and use the right mouse button to bring up context-sensitive menus. Features include a text file viewer, a quick directory changer, macro commands, a command-line box, and a configurable tool bar. It also lets you create Program objects with two mouse clicks. All for a registration fee of $30. Available as DM2101.ZIP on PC World Online and other online services. QB Software, P.O. Box 8016, Rochester, MN 55903, 507/252-1621 (BBS).

Reader service no. 738

JoeView

✔SHAREWARE Here's a bitmap viewer and manipulator with an attitude. JoeView handles all the common bitmap types (BMP, TIFF, JPEG, PCX, and GIF) and lets you view them one at a time or in an impromptu slide show. It also rotates, crops, and smooths images—and even changes their color mapping. Registration fee is $30. Available on PC World Online and other online services as JOEVW122.ZIP. Crunch Products, P.O. Box 370353, San Diego, CA 92137-0353.

Reader service no. 739

THREE OF THE BEST BARGAINS FOR OS/2: BackMaster does tape backups, JoeView displays and manipulates bitmaps, and DeskMan/2 helps you customize your desktop.

WipeOut; System Sounds

MULTIMEDIA For the ultimate in cheap thrills, both of these programs do wonders. WipeOut is a screen saver with more than 15 fun modules, including a space shuttle message carrier and an Asteroids-like game that lets you shoot down your icons. And if you have any After Dark modules, WipeOut can use those, too. System Sounds, in the meantime, lets you attach WAV files to nearly any actions you can perform in OS/2. The programs list for $59.95 each, though I've spotted them for as little as $44. BocaSoft, 407/392-7743, 407/392-1369 (fax).

Reader service no. 740

it can print whatever your business needs—from checks and invoices to 1099 and W-2 forms. The excellent audio tutorial cuts learning time. One-Write Plus lists for $69.95, but I found it for $49.99—about half the cost of competitors. NEBS Software, 603/880-5100, 603/880-5102 (fax). —*P. S.*

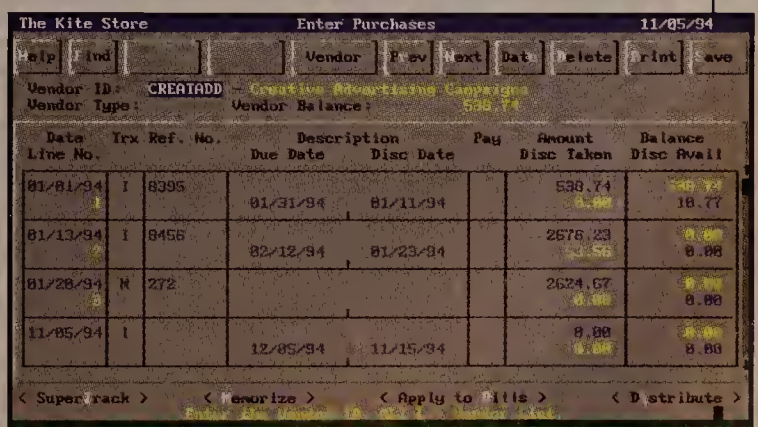
Reader service no. 715

Quicken 3.0 for Windows

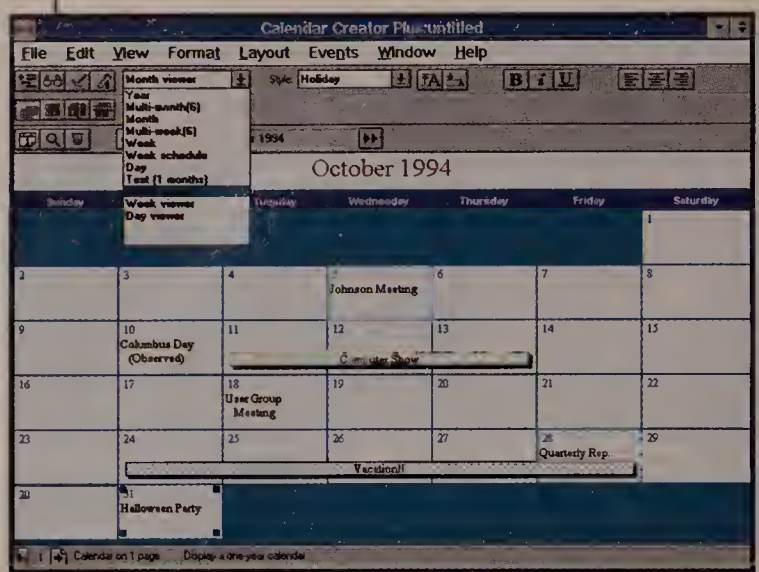
The undisputed personal-finance champ is still Intuit's down-to-earth accounting program—as easy to use as a checkbook and not half as painful. The biggest improvement over version 2.0 is the Financial Calendar—designed especially for those of us who see a checkbook not as a payment register but as a calendar of debt. I just drag a payment from a list of transactions, then drop it on the date I want to pay the bill. Another improvement is the Financial Planner, which displays a graph of your cash flow and net worth right below your register—a great planning tool when you're making tough financial decisions. With the $69.95 list price discounted to $40, buying Quicken 3.0 doesn't count as a tough financial decision. Intuit, 800/624-8742, 415/322-0573. —*P. S.*

Quicken Companion 2.0

I don't know how many times I've started to key my home and business inventory into a database, only to lose heart after listing a few rooms of furniture and appliances. Quicken Companion 2.0 doesn't completely eliminate the drudgery,



YOU DON'T HAVE TO SPEND A FORTUNE on top-flight accounting and payroll help—not when you have One-Write Plus 4.0.



CALENDAR CREATOR PLUS lets you choose among 12 different ways of looking at your schedule.

but it does tie in with my Quicken 3.0 for Windows accounts. I get an accurate picture of my net worth, which helps during my annual insurance review. In addition, I use the stock quotes feature to dial into CompuServe (nonmembers dial a 900 number), grab market quotes for selected stocks and funds, then send the data to my Quicken accounts. Finally, Quicken Companion's accurate but simple tax estimator helps when you're planning that annual homage to bureaucratic bloat. The list price is $34.95 ($19.95 if you have Quicken 3.0). Intuit, 800/624-8742, 415/322-0573. —*P. S.*

Personal Information Management

Calendar Creator Plus 5.0

If you have to track a lot of events but you don't need all the features of a personal information manager (PIM), try Calendar Creator Plus—the easiest, most powerful calendaring program I've used. To begin with, I can print full-page calendars or choose from more than seven layouts, including a pocket-size booklet. I can also add zest to my calendars by importing from 12 graphics file formats in addition to full-page color or black-and-white photos. The program lets me set individual and recurring events in just about every way I can think of, and the CD-ROM version includes a clip art manager and over 2000 images. If you're networked, you can publish group calendars, combining lists from associates. The list price is $79.95, but I've seen both the CD-ROM and floppy versions selling for just under $50. SoftKey International, 617/494-1200, 617/494-1219 (fax). —*S. B.*

Reader service no. 716

Sidekick 1.0 for Windows

Remember Sidekick, Borland's great little pop-up PIM from the years before the acronym was coined? I'm happy to say it's back, complete with calendar, card file, and flat-file database—to say nothing of a quick dialer; to-do lists; a notepad; a report generator; and options for printing labels, address books, and notes. For quick one-click access, Sidekick adds an icon to your applications' title bars. But you'll have to buy quickly: The first million copies will sell for $29 apiece; after that, it's up to a list price of $99, with a likely street price of $69. Borland International, 800/331-0877, 408/431-1000. —*S. B.*

Reader service no. 717 continued on page 133

ACQUIRING SHAREWARE

Shareware is great. You get your software for a moderate delivery fee, try it out, and pay for it only if you like it. And what you pay is generally a bargain. How can you try out this shareware? If you have a modem, you can find all the shareware and freeware programs discussed here in one place. On the CompuServe account, type GO PCWORLD to get to the PC World Online forum. On America Online, use the keyword PCWORLD. Or call *PC World*'s direct BBS at 415/974-7303. In any of these cyberspace connections, you'll find the programs we mentioned here in the "Featured This Month" library.

Of course, there are plenty of other electronic services and BBSs with good shareware connections. And if you don't have a modem, you can ask a shareware distributor to send you the programs on floppies for a small service charge. You can also buy shareware on CD-ROM or on floppies in some stores (see "Shareware on CD-ROM").

And don't forget, your local user group is a rich source of shareware. Most clubs have extensive libraries, and you can pick up programs at monthly meetings or through a members-only BBS. Check out the listings in this month's *Consumer Watch* or call the Association of Personal Computer User Groups' locator number, 914/876-6678.

One more thing: You don't give away your labor for free, and neither do shareware authors. If you like a program, send in the registration fee. —*S. B.*

Online Services and BBSs

America Online
800/827-6364, 703/448-8700
Channel 1
617/354-3230 (BBS)
CompuServe
800/848-8199
Exec-PC
414/789-4210 (BBS)
Executive Network
914/667-4567 (BBS)
PC World Online
See page 12 for information on joining.

Shareware Distributors

EMS
301/924-3594, 301/963-2708 (fax)
PC-SIG
408/730-9291, 408/730-2107 (fax)
Public Software Library
800/242-4775, 713/524-6398 (fax)
Software Excitement
800/444-5457, 317/286-3182 (fax)
The Software Labs
800/569-7900

everything IS NEW.
nothing IS THE WAY it WAS.
it's the wake-UP CALL for a NEW way of WORKING.
TIME TO rise and shine.

INTRODUCING 1-2-3 RELEASE 5. NOW THE LEGENDARY SPREADSHEET BRINGS MORE PEOPLE TO THE NUMBERS AND THE NUMBERS TO LIFE.

1-2-3® has always helped individuals become more productive. Now it goes to a new realm—workgroup productivity. With strengthened ties to Lotus Notes® and new, sophisticated routing features, workgroups are using 1-2-3 Release 5 to make decisions, reach consensus and explore possibilities.

No other spreadsheet has the features of 1-2-3 Release 5. Features that make everyday spreadsheet tasks easier. Features that help you move from task to task fluidly. Maximum productivity, minimum effort.

TAP THE POWER OF NOTES WHEN YOU'RE IN 1-2-3. TAP THE POWER OF 1-2-3 WHEN YOU'RE IN NOTES.

Say you're working on the annual budget in 1-2-3. You can save your spreadsheet in Notes. Then share ideas and information with colleagues working on the same budget at the same time.

Lotus NOTES READY

Any changes to your spreadsheet are automatically synchronized and distributed thanks to Notes replication technology. Plus Notes' security protects the integrity of your data.

When you're working in Notes and want to crunch numbers, prepare budgets or perform "what-if" analyses, you can launch into 1-2-3 with Notes/FX™ 1.1—to get the power of 1-2-3 right in your Notes application.

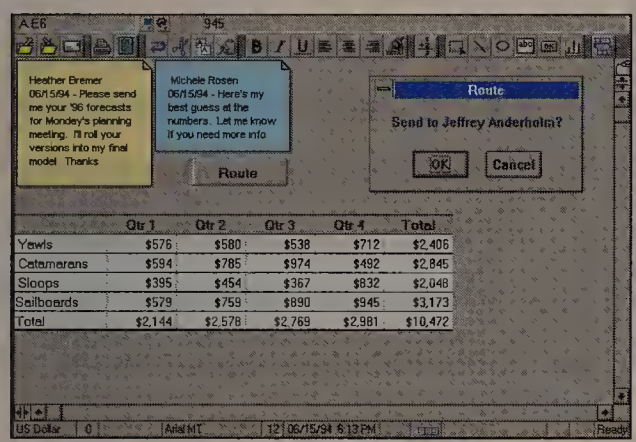
Notes/FX goes beyond OLE to provide you with a dynamic two-way exchange of key information

freedom of MOVEMENT, NOT chains of COMMAND.

between Notes and 1-2-3. So you can roll that 1-2-3 information back into any Notes application.

POWERFUL WORKGROUP FEATURES EVEN WITHOUT NOTES.

1-2-3's powerful Version Manager™ lets each person in your workgroup save multiple sets of charts to any name range. So you know the who, what, when and why of every change all the time.



1-2-3's Range Routing lets you share data with colleagues—sequentially or all at once—collecting their comments and input into a single document.

Plus, unlike other spreadsheets, 1-2-3 can designate particular ranges for comment or review by particular users, rather than routing the entire worksheet. Range Routing lets you mail the spreadsheet range to workgroup members for input, track progress, then roll everyone's ideas back into your file, complete with comments and changes tracked as versions.

1-2-3 Release 5 worksheets and ranges can be routed using either VIM or MAPI based e-mail and can be routed either serially or in parallel.

MAXIMUM PRODUCTIVITY, MINIMUM EFFORT.

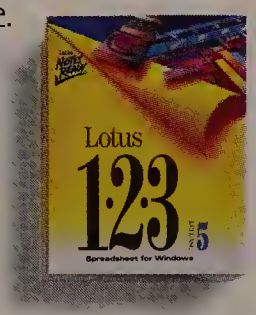
1-2-3 Release 5 is packed with innovative new features designed to help you get more done with less effort.

SmartMasters™ are predesigned and customizable templates of everyday business forms—like expense reports, invoices and purchase orders—with built-in intelligence to guide you through common tasks in record time. Or create custom SmartMasters for yourself or your workgroup.

With Lotus Maps you can create instant maps of geographic data. Select a range of data and watch 1-2-3 Release 5 create the appropriate map with color-coding based on data ranges. 1-2-3 Release 5 ships with maps for the world by country, U.S. by state, Canada by province, Europe, Mexico, Japan, Taiwan and Australia.

1-2-3 Release 5 features seamless integration with Lotus Approach® database to easily create data entry forms and generate reports and mailing labels.

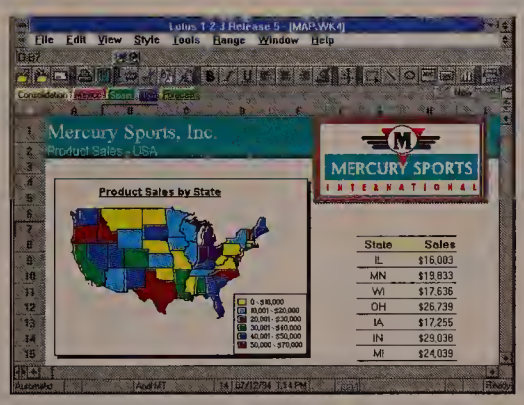
With Fast Format you can apply the formatting you've designed for one range to any other range in the worksheet—with one click of the mouse.



One-Step Charting lets you build a chart complete with labels, titles and legends, all in a single step.

Drag-and-Fill fills in ranges from other documents in just one step. And our improved OLE 2.0 Drag-and-Drop lets you move copy or data across worksheets or files fast.

Multi-page Print Preview lets you view up to nine spreadsheets on your screen before you print.



1-2-3 Release 5 features Lotus Maps. It's the easiest, most effective way to analyze your spreadsheet data geographically.

Taken all together, the new 1-2-3 is loaded with enhancements that make getting the job done a whole lot easier—alone or in a workgroup. And 1-2-3 Release 5 gives you the best compatibility with 1-2-3 for DOS of any spreadsheet. To learn more about 1-2-3 Release 5, visit your Lotus Authorized Reseller or call **1-800-TRADE-UP, ext. A139*** for a free demo disk. A 1-2-3 upgrade costs $119.**

Lotus
Working Together®

NEW SMARTSUITE 3.0. A MAJOR RELEASE TO HELP YOU AND YOUR TEAM WORK TOGETHER.

To work better people need powerful desktop applications, built for both individual and team productivity. SmartSuite® 3.0 is exactly that. It's the best suite for this new way of working because it's the only suite built to optimize Lotus Notes.

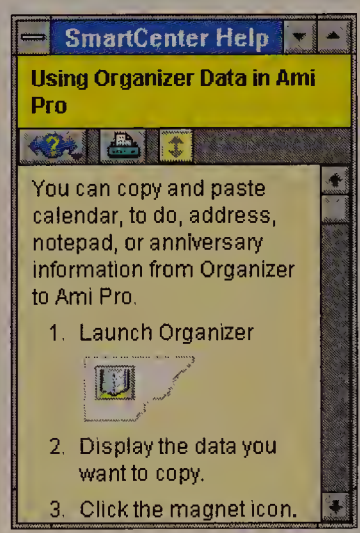
The applications that make up SmartSuite have been upgraded in some very important ways—so they work harder and work together better than ever.

1-2-3 Release 5 is packed with new features like SmartMasters spreadsheets templates, Lotus Maps for geographic visuals of data, Smart Assistants to guide you, seamless integration with Approach database, Range Routing for

mailing spreadsheet ranges, OLE 2.0 Drag and Drop, and, of course, Lotus Notes Integration.

The new Lotus Approach 3.0 offers unprecedented ease-of-use, PowerClick™ reporting, X10™ technology (our new, exclusive, speed-optimized architecture) and the easiest-to-design forms, mailing labels and cross-tabs on the market.

Ami Pro® 3.1 offers powerfully fast word processing (49% faster than Word, 103% faster than WordPerfect®†), low memory/hard disk requirements (4MB RAM, 15MB for complete installation), with proofing tools, collapsible click and drag outlining, revision marking, powerful macro language and automatic list renumbering. There are over 55 predesigned style sheets for memos, faxes, reports and more. Built-in charting & in-context drawing tools. Ami Pro also seamlessly imports documents from other word processors.



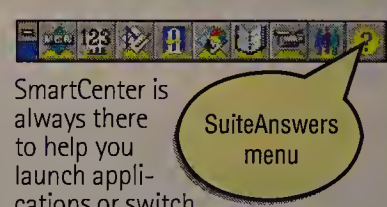
Help Card, one of SmartSuite's powerful help tools, guides you through cross-application tasks.

Freelance Graphics® 2.1 features task and industry specific SmartMasters, a unique 3-step process to create presentations, charting and drawing, presentation management and improved import/export capabilities.

And Organizer™ 1.1 offers easy linking for cross-referencing, flexible printing, group scheduling and nifty integration with Ami Pro so you can create monthly calendars in Ami Pro from Organizer appointments.

SMARTSUITE 3.0 IS A BETTER INTEGRATED SUITE ACROSS THE BOARD.

The integration in SmartSuite begins with a consistent look and feel across applications—they share a common user interface, menus, SmartIcons® and a Live Status Bar.



SmartCenter is always there to help you launch applications or switch between them. And Bubble Help is right there for you-all you do is point.

SmartCenter, the headquarters for cross-application services, is always there to help you switch or launch applications. You can customize its icon palette into the configuration that's most convenient for you.

SuiteAnswers are cross-application help tools which include a SmartSuite Guided Tour and task-oriented Help Cards—plus the new ScreenCam™ for creating audio/visual "screen movies." It's the only help service in Windows™ that stays up as you move between applications.

Smart Assistants are your step-by-step guide through common tasks.

And our powerful 1-2-3/Approach database integration lets you analyze and format 1-2-3 data, taking full advantage of Approach's easy-to-use

forms and reports, dynamic crosstabs to pivot rows and columns and tools for creating summaries or viewing data in several formats.

Lotus Authorized Reseller or for a comprehensive multimedia overview call **1-800-TRADE-UP, ext. A140*** for the free Lotus Product Gallery CD. A SmartSuite upgrade costs $299.††

Lotus NOTES READY™

the COMMITTEE IS dead. long live the TEAM.

SMARTSUITE, THE NOTESREADY SUITE, EXTENDS THE DESKTOP TO THE WORKGROUP.

SmartSuite 3.0 includes powerful workgroup enhancements. But for an even higher level of workgroup capability, just add Lotus Notes and see what happens:

Combined with Lotus Notes, 1-2-3 Release 5 becomes a model management system that lets team members search a library of worksheets.

Add Notes to Ami Pro 3.1 and it becomes a real "workgroup processor." Use the built-in Notes database for efficient, secure document sharing and tracking. And you can format your Notes or cc:Mail® messages directly in Ami Pro.

Approach 3.0, the top-rated Windows database, becomes a shared reporting, forms and analysis tool. Its advanced integration with Lotus Notes lets you build sophisticated, information-intensive workgroup applications and join Notes data to other types of databases, from dBASE to SQL.

And Freelance Graphics 2.1, used with Notes, becomes a presentation storage system, a library of past presentations, which a team can browse and pull from to create new ones.

For more information on SmartSuite Release 3.0 and each of the 5 top applications that make up SmartSuite, visit your

Lotus®
Working Together®

SMARTSUITE 3.0

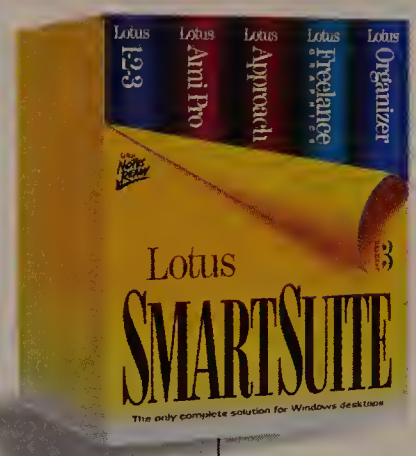
SmartCenter
(to move between applications)

SmartMasters
(for predesigned templates)

Fast Format
(apply styles throughout documents)

ScreenCam
(to put your ideas in motion)

Smart Assistants
(to guide you)



Configurable Single Install
(for easy one-step installation)

Small Footprint On Your PC
(the most efficient suite available)

1-2-3/Approach Integration
(database power in your spreadsheet)

Lotus NOTES READY™

1-2-3 RELEASE 5 SPREADSHEET

SmartMasters
(useful predesigned templates)

Lotus Maps
(geographic visuals of data)

Lotus Approach Integration
(for extra database power)

Smart Assistants
(to guide you)

Range Routing
(for mailing spreadsheet ranges)

Direct Access To Database Files
(open dBASE and Paradox® files directly into 1-2-3)

OLE 2.0 Drag-And-Drop
(move or copy data, with visual mouse cues)

APPROACH 3.0 DATABASE

PowerClick Reportwriter
(for wysiwyg design)

Smart Assistants
(to guide you)

InfoBox
(instant on-screen manipulation)

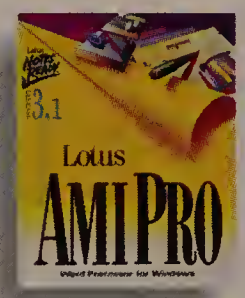
X10 Speed Architecture
(for blazing speed)

Lotus 1-2-3 Integration
(for working with 1-2-3)

PowerKey™ Technology
(for direct access to existing data)

Dynamic Crosstabs
(for drag-and-drop analysis)

AMI PRO 3.1 WORD PROCESSOR



New Proofing Tools
(for easy document proofing)

Collapsible Click-And-Drag Outlining
(simplifies organization)

Revision Marking
(edit documents without confusion)

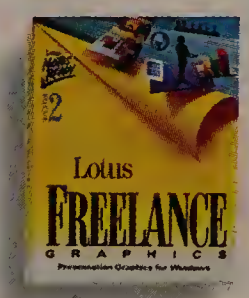
New Style Sheets
(more professionally designed templates than ever)

Text Styling
(make your e-mail look better)

WordPerfect Switchkit®
(the move from DOS is painless)

Stick-It Notes
(add comments and messages)

FREELANCE GRAPHICS 2.1 PRESENTATION GRAPHICS



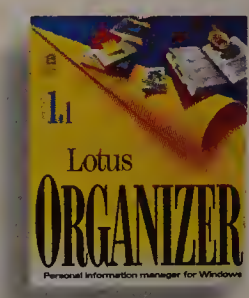
Unique Three-Step Process
(for quick and easy presentations)

One-Click Charting
(access a library of charts and drawings with one click)

Page Sorter
(presentation management at a glance — review and rearrange with ease)

Import/Export
(more file formats than ever — including Harvard/DOS and PowerPoint® 3.0)

ORGANIZER 1.1 PERSONAL INFORMATION MANAGER



Easy Linking
(makes cross-referencing simple)

Flexible Printing
(for your manual planner, mailing labels from your address book)

Group Scheduling
(use with cc:Mail to set up meetings with anyone on your WAN or LAN)

Real Time Access
(instantly view co-workers' busy and free time)

how the NEW SMARTSUITE 3.0 HELPS workgroups work.

The new SmartSuite 3.0. Featuring major new releases of 1-2-3, Ami Pro, Approach database and Freelance Graphics — plus the popular and powerful personal information manager Organizer — this is the ultimate integration of your most important desktop tools. For more information on SmartSuite Release 3.0 and each of the 5 top applications that make up SmartSuite, visit your Lotus Authorized Reseller or for a comprehensive multimedia overview call **1-800-TRADE-UP, ext. A140*** for the free Lotus Product Gallery CD. A SmartSuite upgrade costs $299.††

Lotus
Working Together®

*In Canada call 1-800-GO-LOTUS. **$119 suggested retail upgrade price. †NSTL, May 1994. ††$299 promotional price available while supplies last. ©1994 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. Lotus, Lotus Notes, 1-2-3, Approach, Ami Pro, cc:Mail, Freelance Graphics, SmartSuite, SmartIcons and Working Together are registered trademarks and ScreenCam, PowerClick, Notes/FX, Version Manager, SmartMasters, Organizer, PowerKey, X10 and NotesReady are trademarks of Lotus Development Corporation. WordPerfect and Switchkit are registered trademarks of WordPerfect Corporation. PowerPoint is a registered trademark and Windows is a trademark of Microsoft Corporation. Paradox is a registered trademark of Borland International, Inc.

Time and Chaos 4.04

✔SHAREWARE Making order out of chaos is the work of physicists and chambermaids, but nothing beats Time and Chaos for straightening out my crazy workday. This program shows my critical, time-dependent information—a to-do list, appointments, a telephone book, and a calendar—all on a single, neat Windows display. The right mouse button brings up other features, including a notepad, an envelope printer, and a link to my word processor. I can create reports from almost every Time and Chaos component and connect them via DDE to Excel. I'll bet if Einstein had used a computer, he'd have Time and Chaos up on screen. Available as TCHAOS.ZIP on PC World Online and other online services; the registration fee for the program is $29.95. Isbister International, 214/495-6724, 214/530-2762 (BBS). —*S. B.*

Reader service no. 718

Publishing and Presentations

AdMaker 3.5

✔SHAREWARE It's easy enough to have the local quick-print shop make a small display ad for your business. But if you do it more than once, use this super-quick Windows ad designer instead. AdMaker's interface seems quirky at first, but I came to appreciate the small preview window and accessible tools. In less than 30 minutes—about what it takes me to drive to the print shop and back—I created a suitable 6-by-4-inch ad. AdMaker prints camera-ready copy, complete with crop marks and customer-approval lines. Maybe my print shop should get a copy. Available as ADMAKE.ZIP on PC World Online and other online services; registration fee $30. OsoSoft, 805/528-1759, 805/528-3074 (fax). —*P. S.*

Reader service no. 719

CompuWorks Publisher 1.0 for Windows

I've created a few newsletters and advertisements with WinWord 6.0, but I've always yearned for something better. Trouble was, I didn't yearn enough to spend big bucks for a dedicated desktop publishing package. CompuWorks Publisher solved my dilemma with simple tools and a rock-bottom price. Don't get me wrong—this is no QuarkXPress or PageMaker; it's not even a Microsoft Publisher. But CompuWorks Publisher is good enough for my modest needs. This Windows program uses a frame model to compose its pages, and it lets me easily load stories and pictures into my documents. While it lacks some essentials (an Undo command, for example), the program's list price of $49.99 rates a headline. WizardWorks, 612/559-5140. —*P. S.*

Reader service no. 720

Print Artist 2.0

Designing an informative mailer, an attractive letterhead, or a personal greeting card doesn't require a $500 desktop publishing program. Put Print Artist on your electronic easel and you don't even have to make a lot of design decisions—just pick one of the program's predesigned documents and edit it to your liking. Or you can start with a blank template and insert your own art and text if you're so inclined. Print Artist supports TrueType and PostScript Type 1 fonts and includes a library of more than 700 graphic images. You can also import BMP, TIFF, EPS, GIF, or Print Shop files. All this plus sophisticated special effects, an easy-to-understand interface, a well-written guide to effective design, robust performance, and a list price of $49.95. It's almost like printing money. Maxis, 800/336-2947, 510/254-9700, 510/253-3736 (fax). —*P. S.*

Reader service no. 721

Visio Express

If it's true that a picture is worth a thousand words, then my stick-figure dabbling is like drawing in a foreign language. But Visio Express changes all of that, with drag-and-drop stencils and rock-steady integration with Microsoft Office applications. Using the Visio Express button on my WinWord tool bar, I don't give a second thought to drawing a map, creating a flowchart, or designing informative graphics to help communicate my ideas. I especially like the program's stencil metaphor. This OLE 2.0 server doesn't run as a stand-alone—you need Visio 2.0 for that—but if you want a robust replacement for the weak drawing tools in Word for Windows or Excel, this is it. Visio Express retails for just under $80, but I found it for around $48. Shapeware, 800/446-3335, 206/521-4500. —*P. S.*

Reader service no. 722

FREE

No Edlin

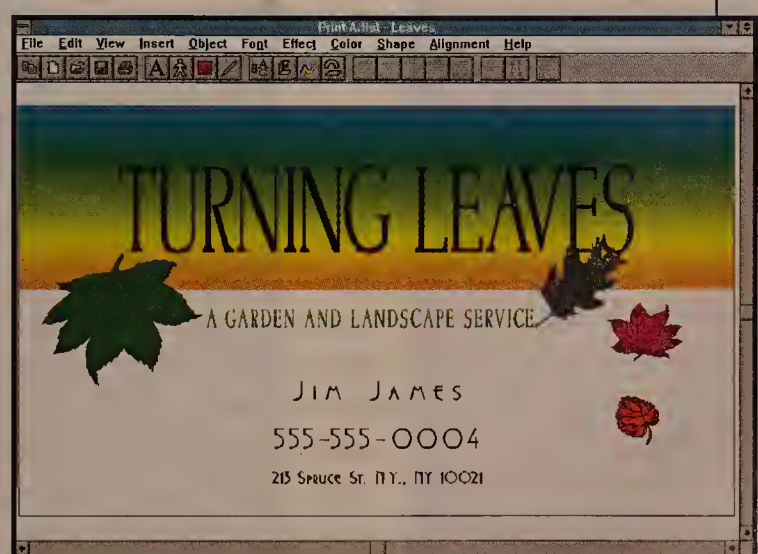
No Edlin is a 64K DOS text editor with a few nice word processing features. You get word wrap, search and replace, document and paragraph formatting, multiple resizable windows, and even cut-and-paste editing using a mouse and standard keyboard commands. No Edlin also runs your favorite spelling checker—find a free one, and the whole deal won't cost you one red cent. Available as NE20.ZIP on PC World Online and other online services. —*P. S.*

Spreadsheets

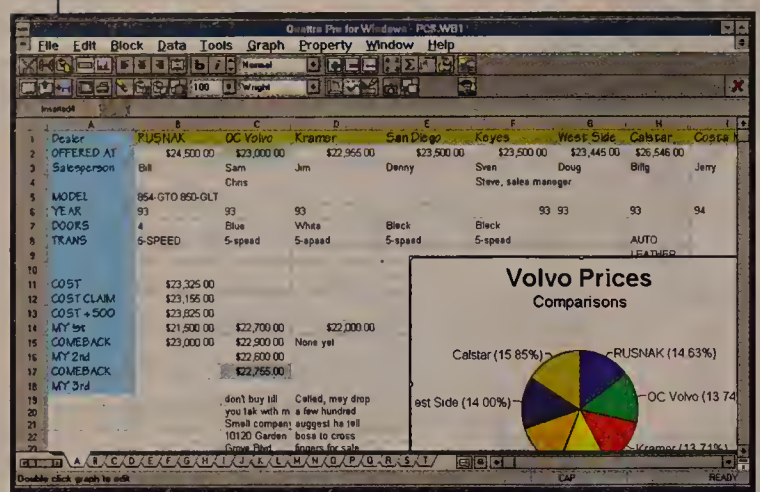
JQCalc for Windows

✔SHAREWARE Now here's something you don't see every day: a spreadsheet that's small enough to fit on a floppy. Weighing in at a little over 600K, JQCalc offers all the basic worksheet functions and editing tools, along with column alignment and a helpful AutoSum feature. It has automatic or manual recalculation, a reasonable print preview, and an adequate 10,000-cell worksheet. When you send in your $36 registration fee, you'll get 3-D graphics as well. One negative: JQCalc uses its own file format and doesn't import or export to anyone else's. You'll find the program as JQC1-0.ZIP on PC World Online and other online services. JQL, CompuServe ID 73062,2642. —*S. B.*

Reader service no. 723



LOW-COST ADVERTISING: Any small business can produce professional-looking signs, cards, and fliers with Print Artist.



A FULL-FEATURED SPREADSHEET FOR LESS THAN $50? Amazingly enough, WordPerfect-Novell's Quattro Pro for Windows—one of the most powerful spreadsheets around—costs less than one seat at a Broadway show.

Judy's TenKey 3.0

✔SHAREWARE I often need a number cruncher more powerful than the calculator that comes with Windows—hey, that's not asking for much—but I don't want to load a full spreadsheet. My solution? I whip out Judy's TenKey, a stunningly powerful calculator with financial, scientific, statistical, and plain old adding-machine functions. I can save or print the scrolling history tape, and to make my life easier Judy's TenKey stays on top for quick calculations. The only thing missing is a WAV sound of numbers crunching. And to Judy I say, "TenK you for writing it." Available on PC World Online and other online services as 10KEY.ZIP; the registration fee is $17.70. PSL, 800/242-4775, 408/244-0744. —*S. B.*

Reader service no. 724

Quattro Pro 5.0 for Windows

For many users, *PC World* Best Buy Quattro Pro for Windows is the best spreadsheet on the market. It was priced at $99.95 when we cited it last February; that it now lists for less than $50 is nothing short of miraculous. Quattro Pro offers so much, I can only scratch the surface: three-dimensional notebooks with tabbed pages, a superb data modeling desktop, valuable speed bars for often-used commands, access to formatting features with the right mouse button, and Experts to get you through complicated tasks. By the time you read this article, Quattro Pro should be a Novell product, and it should still be selling for a list price of $49.95. WordPerfect, the Novell Applications Group, 800/451-5151. —*S. B.*

Reader service no. 725

Utilities

K-Free 5.11

✔SHAREWARE If you've ever had Windows crash because of low resources, you know it's important to keep track of your system's status. That's why you need K-Free, a slick memory- and disk-monitoring program. K-Free watches your computer and reports the free disk space on all drives, the number of tasks running, the available memory, and the percentage of free system resources. If you drop too low for comfort, an alarm sounds. To keep your desktop's clutter down, you can reduce K-Free to an information-laden icon and bring up the details only when you need them. Available as KFREE.ZIP on PC World Online and other online services; registration fee $20. Dragon's Eye Software, 214/221-1530; CompuServe ID 76057,101. —*S. B.*

Reader service no. 726

Plug-In 2.10 for Windows

MULTIMEDIA ✔SHAREWARE Plug-In is a snappy enhancement for Program Manager that doesn't make a dent in your wallet *or* your hard disk. The program's many features include nested groups, a scheduler with alarms, title-bar displays showing system info and resource alerts, and custom cursors. A handy PowerButton attaches to any Windows application you're using, so access to Plug-In—and other Windows apps—is never more than a mouse click away. And there's more: sound support with talking clocks, a history of File•Run commands, and a screen saver shortcut key. So download Plug-In as PLUGIN21.ZIP on PC World Online and other online services (registration fee $20)—and see why I'm so excited. Plannet Crafters, 404/998-8664, 404/740-8583 (BBS), 404/740-1914 (fax). —*S. B.*

Reader service no. 727

PrintSwitch 3.0

✔SHAREWARE Switching printers or preparing to send a fax always used to mean a tedious trip to the Windows Control Panel or an application's printer setup menus. That's why I'm delighted with PrintSwitch 3.0, an ingenious little utility that lets me instantly change my default printer, toggle the paper orientation, and switch Print Manager on and off. PrintSwitch is available on PC World Online and other online services as PSW30D.ZIP; registration fee $10. Graphic Impact, 805/378-7232, 805/482-6213 (fax). —*S. B.*

Reader service no. 728

Un Installer 2.0

Everyone's got to do it eventually: Uninstall a Windows application. But figuring out which files are safe to erase is a messy and sometimes frightening affair. Well, the job is a lot easier than it used to be, thanks to Un Installer. This program rids your system of unused display drivers and Windows fonts, and it does a decent job of finding and removing orphaned programs, DLLs, and duplicate files—all with plenty of 'Confirm all deletions' safeguards. It's really simple: If you use Windows, you've just got to own the Un Installer. The program retails for $69.95, but I've seen it sold for as little as $40. MicroHelp, 800/922-3383, 404/516-0899. —*S. B.*

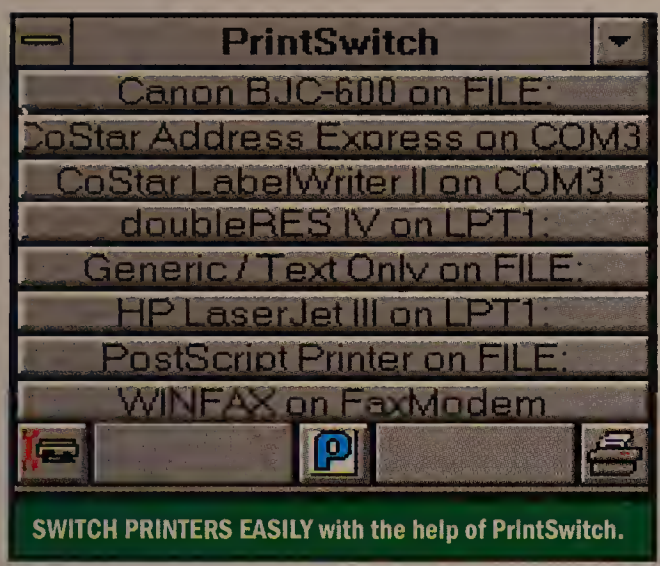
Reader service no. 729

DON'T REPLACE PROGRAM MANAGER. Let Plug-In for Windows improve it instead.

FREE

Windows Editor 2.01

Notepad is like the weather—everybody complains, but nobody does anything about it. Well, almost nobody. Harry Gensler at Loyola University in Chicago has created Windows Editor 2.01, which lets you set different colors for Notepad windows and gives you better control over fonts, tabs, word wrap, and other editing niceties. Available as WED201.ZIP on PC World Online and other online services. —*P. S.*



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Word Processing and Text Editing

Boxer 6.0a

✔SHAREWARE Boxer made it into last year's "Great Software Under $50" (April 1993), and since then the program has added more than 75 features. It's still a first-rate DOS text editor, but now it's gone far beyond that. With undo and redo commands, a built-in calendar, a calculator, line drawing tools, full mouse support, drop-down menus, and the capability to open multiple files, Boxer can be a fine laptop word processor, a program editor, or a batch file viewer and creator. Keyboard commands can mimic those of Microsoft Word for DOS, WordPerfect, WordStar, and other applications, cutting learning time way down. You can even associate specific configurations with file extensions. Available as BOXER600.ZIP on PC World Online and other online services; registration fee $35. Boxer Software, 800/982-6937, 603/924-6602, 603/924-4471 (fax). —*P. S.*

Reader service no. 730

LetterPerfect

Maybe you don't need a $300 word processor with style sheets, WYSIWYG display, autoformat, Intellisense, and all the other video claptrap and featuritis that have turned your 340MB hard disk into a dedicated electronic typewriter. Maybe what you need is a hearty document maker with all the write stuff—and LetterPerfect delivers, with a spelling checker, a thesaurus, limited graphics import support (WPG format only), macros, and mail merge capability. Hardware requirements are minimal—a 286 (remember those?) with a hard disk will do. File import is limited to ASCII and WordPerfect 4.2 and 5.1, and font support is whatever your printer can give you; but even with those sacrifices, such a strong word processor that lists for only $79 (and is available on the street for $36) deserves note. WordPerfect, the Novell Applications Group, 800/451-5151. —*P. S.*

Reader service no. 731

Perfected 3.0

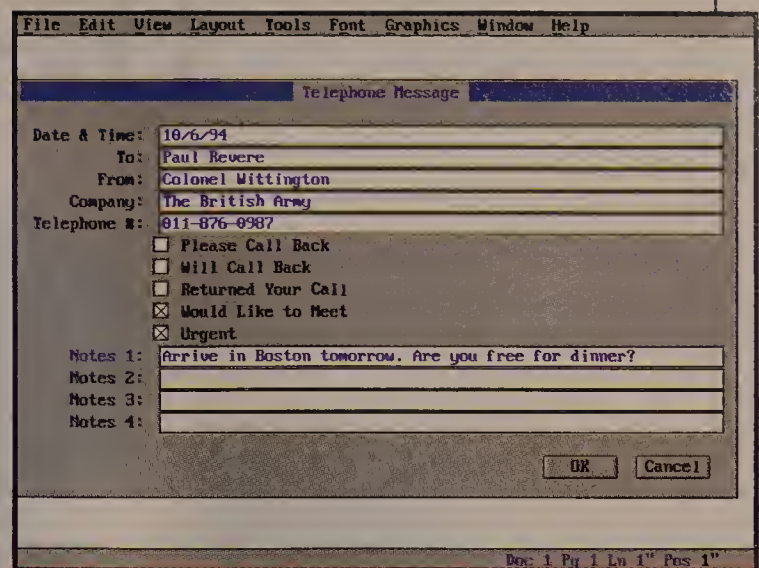
This WordPerfect 6.0 for DOS add-on solves several nagging office problems. It addresses letters and creates invoices without ever forcing you to leave WordPerfect. What's more, it makes it easier to use some of the word processor's more powerful features. Perfected acts as a message center, address book, and document manager, and you can use a hot key to make it pop up within WordPerfect. If you need to address a letter, Perfected finds the right address and inserts it into your text. It also gives you financial forms with calculations, fax cover sheets, a way to save boilerplate passages, and more. It lists for $59.95, but I've seen it on sale for $39. Version 2.0 (for WordPerfect 5.1) costs the same. Niad Corp., 800/263-5833. —*P. S.*

Reader service no. 733

WinEdit Lite 3.0

For about $30, you can ditch that sorry Notepad for good. WinEdit Lite is a text editor with all those wonderful user-interface features—like an icon bar of common commands and the ability to open multiple files—that are found in real applications but missing from Notepad. WinEdit Lite also has what you need in a text editor: search and replace, quick jumps between windows, and an easy way to reload your most recent editing jobs. Preference settings give you better control over this writing tool than Notepad ever dreamed of. The list price is $29.95. Wilson WindowWare, 800/762-8383, 206/938-1740, 206/ 935-7129 (fax). —*P. S.*

Reader service no. 734



PERFECTED BRINGS COMMONLY USED FORMS to WordPerfect 6.0 and makes that popular word processor's most sophisticated functions easier to use.

WinProof 1.0

✔SHAREWARE If your syntax resembles a space alien's first attempt to contact Planet Earth, your memos and reports won't have their intended effect. Before you take that report to your leader, run it past the *tsk-tsk* language maven in WinProof. You can easily configure the program's 44 checkpoints, which cover common grammatical, punctuation, and stylistic rules. WinProof supports interactive editing, so you can correct errors right from your word processor. Or if you like, you can have WinProof check a file and prepare a report for you to read later. And if you decide to bend the rules of language a little, you can comment on your reasons—just in case anybody asks. WinProof is available as WINPRO.EXE on PC World Online and other online services; registration fee $45. Intellect Systems, 206/226-0429. —*P. S.*

Reader service no. 735

FREE

RunApp

Although I live and work in Windows, there are times when I just need to get out. I don't like hanging around, either. RunApp sits almost invisibly at the bottom right of the screen. In its tiny window I can type any of several commands: "dos" to exit to DOS, "exitw" to exit Windows without confirmation, "restart" to exit Windows and restart it, and so on. If a DOS program's directory is on your path, you can launch it by typing its name. Available as RUNAPP.ZIP on PC World Online and other online services. —*P. S.*

Steve Bass is a contributing editor for PC World. *Peter Scisco is a writer based in High Point, North Carolina. Lou Miranda is an OS/2 programmer and consultant who is based in Minneapolis–St. Paul.*

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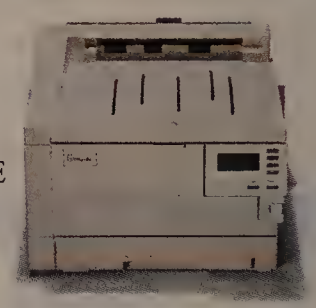

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IBM PC Direct prices and offerings are subject to change or withdrawal. Prices/offerings in Canada may vary. Remarketer prices vary. Shipping and handling charges are extra. [1]IBM Credit Lease prices are quoted for 36-month terms. Lease rates quoted are good through 12/31/94, after which time rates are subject to change without notice. Lease available to qualified commercial customers only. [2]When referring to hard drive capacity, MB stands for 1,000,000 bytes; total user-accessible capacity may vary slightly based on operating system environment. [3]At no additional charge during warranty period. Onsite service available Monday-Friday 8am-5pm in your time zone. Second and third year is customer carry-in service. Please ask your Sales Representative for details. [4]Please call 1 800 426-7904 for details on IBM's moneyback guarantee and limited warranties. Copies available upon request. [5]The energy saving circuitry is activated by the signals sent from the system units that support the VESA DPMS proposal. [6]Upgradable with Intel's OverDrive processor based on Pentium processor technology. [11]EPA, as a matter of policy, does not endorse any particular company or its products. EnergyStar Compliant configurations are available. Ask your sales representative. IBM, HelpCenter, HelpWare, OS/2, Mini-Tower and ExecJet are registered trademarks, and ValuePoint, NET Select and Soft Select are trademarks of International Business Machines Corporation. All other brands and product names are registered trademarks, trademarks or service marks of their respective holders. Windows is a trademark of Microsoft Corporation. Software programs listed are licensed to customers under non-IBM software vendor's terms and conditions provided with the package. IBM makes no representations or warranties regarding non-IBM software. PC Direct is a trademark of Ziff Communications Company and is used by IBM under license. ©1994 International Business Machines Corporation.

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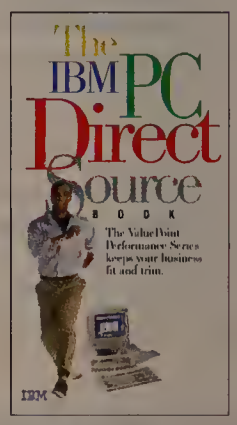

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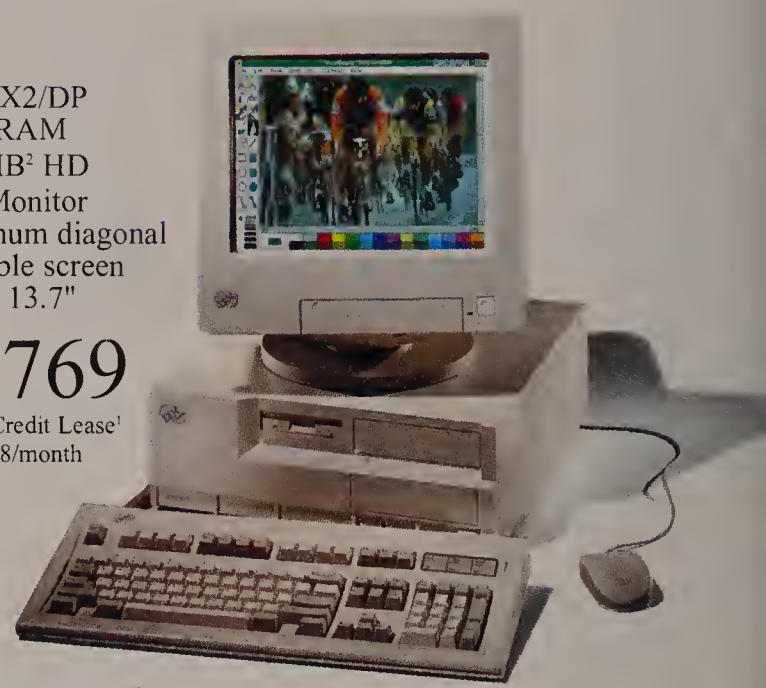

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Kiss the Office Goodbye!

Work where you want, when you want. Advances in technology and evolving corporate culture are redefining the 9 to 5 office routine, and the bottom line benefits.

By Christina Wood

The roads are crowded with commuters cradling car phones, cursing each other in stop-and-go traffic, and choking the air with pollutants. Meanwhile, far from the traffic and the train platforms, enlightened telecommuters work in the comfort of home offices and neighborhood telework centers, sipping coffee, wearing sweats, and getting work done.

According to Link Resources, a New York market research firm, 8.8 million U.S. workers currently telecommute. Thousands more guerrilla telecommuters work at home unofficially one day a week or more—often unbeknownst to others in the company.

"I would think there isn't a single Fortune 100 company that doesn't have someone telecommuting," says Joel DeLuca, a professor at the Wharton Business School in Philadelphia. "But it's often handled on a case-by-case basis, and sometimes it's done underground."

Telecommuting is an umbrella term covering a host of alternatives to the traditional office routine. The most common scenario is working at home when special projects demand uninterrupted time, but the concept includes everything from occasional at-home work to formal programs with established guidelines involving people working out of the office two or three days a week. Some companies have even done away with office space altogether and have a staff that works entirely from remote locations.

The reasons for adopting alternative work arrangements are compelling—and growing more so all the time: Local jurisdictions are requiring employers to reduce the number of workers commuting by car each day; the stress of balancing family and work obligations is prompting many workers to seek alternatives; management has found that the corporate ladder has turned into a step stool, and they need to find ways to reward employees without giving huge pay raises and promotions; and as business becomes more competitive, it's important to get and keep the best employees. When the right person for the job lives

PHOTOS: MICHAEL LLEWELLYN

too far away to commute daily, telecommuting makes it possible to hire them. The Americans With Disabilities Act requires business to accommodate the disabled, and telecommuting is a way to incorporate those unable to commute. Big corporations are also discovering that telecommuting can significantly reduce real estate costs.

The most commonly stated advantage, however, is increased productivity. People who work from home or neighborhood telework centers are 10 to 20 percent more productive than when they work in the office, according to Miller Associates, a market research firm in Ithaca, New York. "One of the main reasons people want to telecommute is they are frustrated with not being able to get done what they need to do in the office," says Gil Gordon of *Telecommuting Review*, a newsletter for employers.

Tips for Making Telecommuting Work

Getting a telecommuting program off the ground isn't hard. But there are a few tricks to making a smooth transition. Try these tips from the experts.

Managing the Telecommuter

1 Take a trial run. Whether you're implementing a telecommuting program for a large number of people or just one employee, establish a pilot program first. Once the pilot is completed, you can fine-tune the program based on your experiences.

2 Prepare a telecommuting proposal. Among the issues you'll want to address will be your company's particular definition of telecommuting, the objectives of the program, which jobs are eligible for the program, what equipment is required and who supplies it, how you'll measure performance, how you'll handle overtime, and how safety and ergonomics are to be considered in remote offices.

3 Pick the right people. Telecommuting should be viewed as an earned privilege, not a right. The best candidates for telecommuting are organized and motivated. If an employee has problems in these areas, explain what they need to improve *before* they can telecommute.

4 Determine how much work needs to be accomplished during the telecommuting trial. At the end of the trial decide whether

Sleep Late, Get More Done

Rachel Axelrad is an auditor with Southern California Edison. She typically works one day a week from the Ontario Telebusiness Work Center near her home. "I get twice the work done in half the time because nobody bothers me," she says. Southern California Edison has a liberal telecommuting program that helps people cope with the demands of the job. "We put in long hours and do lots of outside activities. Anything they can do to make my job easier is great," says Axelrad.

Bill Fox, audits manager for Southern California Edison, supervises Axelrad. He manages several telecommuters whose commutes are long or who have health problems. Fox echoes Axelrad's sentiment: "There are societal benefits: less people on the road and less stress for the employee. And I find that people produce a lot more when they work at home."

Neighborhood telework centers like the one in Ontario are springing up all over the country. Funded by local or federal government agencies interested in alleviating traffic and air pollution problems, or by private industry hoping to keep citizens in the community, telework centers are corporate environments in miniature. The centers make telecommuting a viable option for those who don't have the office space or equipment in their homes or who don't like the isolation or distractions of working at home.

The Ontario center was set up by a consortium of small businesses concerned about local residents spending their time commuting to Los Angeles and Orange counties. Van Romine is the technology administrator at the center. "There was some research done to determine what the major export from our area was. It was people. If we wanted to have any impact on our area, we needed to keep the jobs and people here." The center is now subsidized and managed by the city of Ontario and offers more technology than anyone is likely to have at home. "We have video conferencing and Internet access as well as copiers and fax machines," says Romine. But more than technology, the center offers a helping hand. Romine works with both employers and employees to help them understand the dynamics of telecommuting and overcome their concerns.

The Human Obstacle

Despite the advantages of telecommuting, most workers still make a daily trek to the workplace. Many have jobs that simply don't allow them to telecommute. But why are many information workers whose jobs

There was some research done to determine what the major export from our area was. It was people. If we wanted to have any impact on our area, we needed to keep the jobs and people here.

Van Romine, Technology Administrator, Ontario Telebusiness Work Center

that goal was accomplished. If not, was telecommuting part of the problem?

5 Manage by results. Be willing to judge performance by the quality and timeliness of work—not by the employee's presence in the office. Those who manage telecommuters ought to become coaches and cheerleaders rather than wardens.

6 Establish a training program. Training is critical to a success. For example, teach telecommuters that child care and telecommuting don't mix; instruct managers in how to manage by results.

For the Telecommuter

7 Communicate. Use E-mail, voice mail, pagers, and other methods. Make sure co-workers and clients know how to reach you. You can also have your calls automatically forwarded to your remote office.

8 Create a responsible image. Make an effort to *appear* reliable to managers, clients, and co-workers (*being* reliable sometimes isn't enough). Do this by meeting your obligations. If goals are impossible to meet, renegotiate them before the deadline arrives.

9 Evaluate the tax ramifications. Tax issues will vary depending on how your telecommuting program is devised. Consult a tax accountant or request a copy of the IRS publication #587, "Business Use of Your Home," by calling the IRS at 800/829-1040.

10 Choose the right work space. The telecommuting work space should be comfortable, quiet, and conducive to sustained work sessions. Create an environment that allows you to mentally separate yourself from business once it's quitting time. (In other words, don't set up your desk in your bedroom unless you're very good at knowing when to quit.) Also make sure the space looks professional; family members need to understand that it really is your office—even if it's in the home.

are perfectly suited to telecommuting still working in traditional offices? According to Steve Coulter, area vice president of public affairs at Pacific Bell, "the obstacles are entirely human, not technological."

Again and again we heard the same concerns: Managers worried that they wouldn't know whether employees were working if they couldn't see them. And telecommuters fretted that if they were out of sight, they'd be out of mind: unavailable for impromptu meetings, missing crucial water-cooler networking, and passed over for promotions.

It turns out that managers' concerns are easier to address than telecommuters'. Michael Steward, educational development manager for Pacific Bell, handles internal training for telecommuters and their managers. "What many supervisors don't understand is that just because you can see me doesn't mean I'm working. In fact, I could be a very disruptive force. I could be running around talking to people." Steward points out that once managers accept this possibility, they're more willing to evaluate job performance by an employee's work than by attendance in the office.

The repercussions for telecommuters are harder to overcome. "There is a price paid for all forms of flexibility," notes Paul Rupert, a telecommuting consultant with Rodgers and Associates of Boston. "Telecommuting requires absence from the workplace. And absence is not popular."

DeLuca says the big problem is communication. "Telecommuting is a thin kind of communication. When we sit down together and talk, only about 20 percent of the communication comes from the words we speak. Telecommuting cuts out a lot of [nonverbal] communication." That's why he cautions against having new employees telecommute. It's hard to get to know a person who isn't in the office—but once you know a co-worker, E-mail and phone conversations take on more meaning. The ideal candidate has been with the company long enough so that others can infer the missing 80 percent.

Most experts admit, however, that there's no substitute for face-to-face contact. Many advised limiting telecommuting to two or three days a week. That way the telecommuter still benefits from social interactions at work and can plan to attend critical meetings. Telecommuters themselves need to forestall problems caused by their absence: "You have to use your time and contacts strategically," advises Rupert. "Make a conscious effort to call and run into people electronically. Make sure people know your phone number. Use your time in the office to remind people you exist."

Until telecommuting is more widespread, there will be plenty of sticky problems like these to work through. But it helps when employers take a strong stand in favor of alternative work arrangements. When that happens, management is more inclined to plan events so they occur when telecommuting employees are in the office.

From the Top Down

The cultural acceptance of telecommuting is getting a push from a new direction. Upper management has recently identified telecommuting as potentially helpful with some of the larger issues of running a company: saving money and remaining competitive. Many corporations are discovering that by organizing their telecommuting programs, they can save money and serve customers better.

Pacific Bell has been an advocate of telecommuting since 1984, but lately the company has gotten behind the practice with a vengeance. "Our formal telecommuting policy has gone from acknowledging it to recommending it to strongly recommending it," says Pacific Bell's Steward.

Part of the reason for that policy is the company's need to comply with strict California legislation, which stipulates that any company with 100 or more employees in a building must implement a plan to reduce the number of cars traveling to that location. But it's also because the company is looking for ways to save money. "There has been a shift in the past two years," explains Bob Damaschino, a reengineering implementation team leader in Pacific Bell's real estate planning **continued on page 150**

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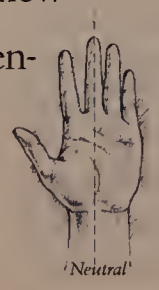

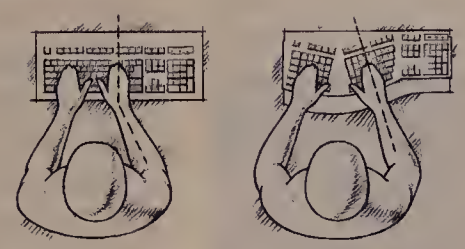

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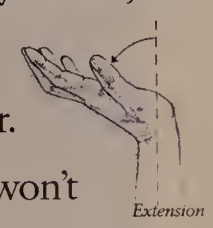

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INTERNATIONAL DATA CORPORATION

IDC Insight: An

Gaining Competitive Advantage

Sponsored by Del

If your company's mobile sales people, service reps, and other field employees routinely use mobile computers in their daily work, then your company may be gaining a significant competitive advantage.

This is the key finding of a recent survey of 400 large and medium-sized U.S.organizations conducted by International Data Corporation (IDC), the world's leading information technology market research firm.

Pursuing a competitive advantage requires investment and planning. Field force automation is more than just equipping sales or service people with the latest notebook computer and contact manager software package and hoping for the best. It requires a systematic approach to acquiring technology, training and supporting field personnel and writing or buying software.

This IDC Insight analyzes the experiences of businesses and government agencies already engaged in field force automation. IDC conducted in-depth telephone interviews with information systems professionals and field managers at companies from a variety of industries.

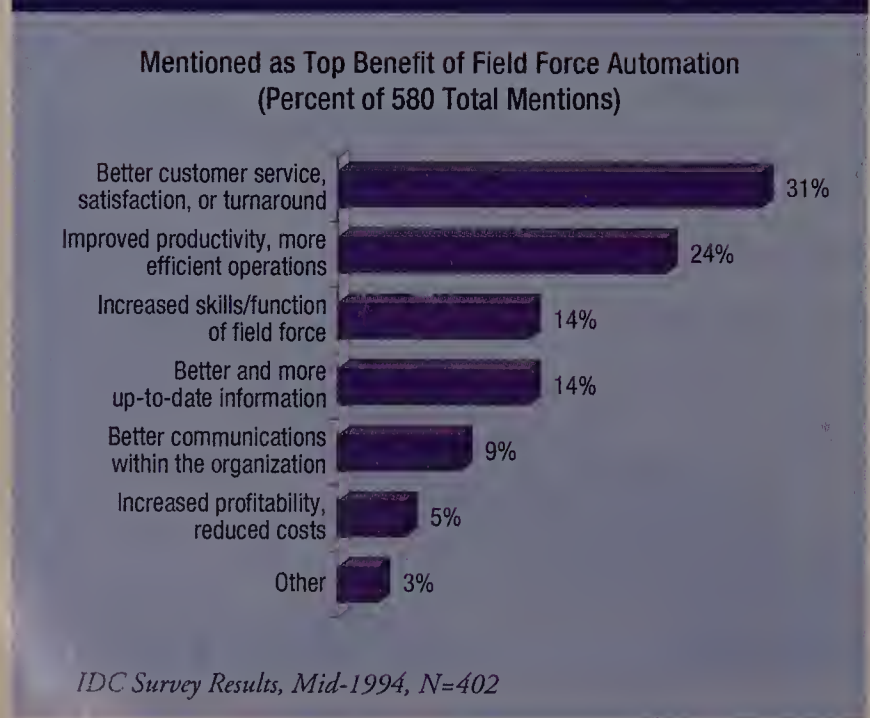
For companies that make the commitment in time and money to field force automation, the payoffs are real.

Key findings are recapped in the sidebar. An in-depth summary of the survey is available in a special *IDC White Paper on Field Force Automation* (see box, bottom far right).

Key Findings

- Over 70% of large and medium-sized organizations are in some phase of field force automation.
- Field force automation is not new for most companies. Over a fifth of those polled were in their third generation of field force automation.
- The key benefits came from productivity improvements and better customer service.
- Key success factors include top management support, training, and a good working relationship among the departments involved.
- The biggest impediments to successful implementation were resistance to change on the part of the sales force and flagging top management support.

Figure 1 — The Benefits of Field Force Automation



Going for the Brass Ring

Automating a field force is no easy task. Nor is there a single standard for systems development—applications can be as simple as providing e-mail support for sales people or as complex as custom-built applications that interface mobile computers with corporate databases.

But for companies that make the commitment to field force automation, the payoffs are real.

The benefits received by the organizations polled are quantified in Figure 1. Most come through better customer service, improved field force productivity, or more sophisticated or efficient field force operations.

Quantifying these benefits of field force automation requires a measuring stick, and the companies polled generally rated their success at field force automation in ranked order, using:

- Internal productivity mea sures, such as transaction time support headcount, or eve sales quotas.
- Customer satisfaction bench marks, e.g., formal custome evaluations, call handling sta tistics, or repeat business.
- Measurement of field forc satisfaction using surveys a well as continued willingnes to fund.
- Financial returns, such a increased revenues or profits c formal return-on-investmen (ROI) calculations.

The ultimate payoff fror field force automation shoul be sustainable competitiv advantage. Here survey respor dents gave automation a vote c confidence. Of the 42% tha considered their automatio efforts ahead of peer organiza tions, 63% felt that they ha

Executive Briefing

hrough Field Force Automation

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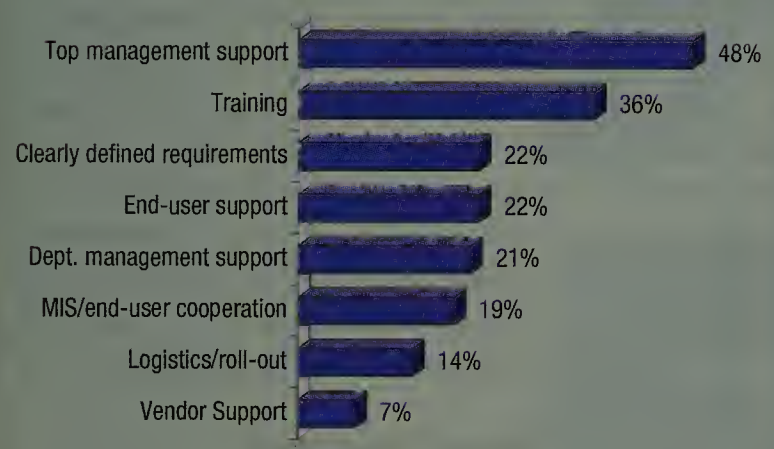
Figure 2 — The Keys to Successful Field Force Automation

What to Pay Attention to in Implementation
(Percent of Leading-Edge* Companies Mentioning)



** Companies rating themselves as further advanced than competitors in field force automation and having a competitive advantage as a result*

IDC Survey Results, Mid-1994, N=94

gained a competitive advantage is a result. This advantage generally meant getting more bang for the buck out of the field force: more qualified leads called by sales people per day, shorter mean-time-to-repair for maintenance technicians, and less downtime for on-site auditors, programmers, or project engineers.

Critical Success Factors

IDC asked respondents who felt they had achieved competitive advantage through field force automation what they considered the critical success factors. Figure 2 ranks these factors.

The success factors are not surprising. But they point out the importance of selling field force automation to multiple constituencies and maintaining that support.

Respondents to the survey recognized the need to see field force automation as an ongoing process requiring continual investment and support to provide the maximum payback.

IDC believes that the ongoing nature of field force automation triggers yet another success factor: an organization's relationship with its supplier and its choice of technology. To support a mission-critical application like field force automation, organizations should consider the vendor of their mobile computers as a business partner—not a commodity supplier. This means evaluating the vendor on:

- System reliability
- System portability
- Availability and support
- Reputation and viability
- Technology replenishment

A well-chosen supplier understands the ongoing nature of field force automation and supports its customers with a long-term program for technology insertion and asset management.

The products need to be durable, easy to use, easy to network, and they need to support common operating systems. Battery life, screen quality, and industrial design will be crucial. Only after a vendor and its products fit these criteria should product price become a major factor.

The cost of the hardware, after all, is a small part of the total cost of implementation.

The Call to Action

The paybacks already achieved by companies using field force automation should motivate others to increase their automation efforts.

Automating sooner is better than automating later. Much of the success of field force automation relies on skills and experiences built over time; organizations not automating today run the risk of falling even further behind.

If there's a single message emerging from the research, and examined in *IDC's White Paper on Field Force Automation* (see below) it's this: Field force automation is no longer an experiment in technology. It's a mainstream way of doing business.

– John Gantz
Senior Vice President
International Data Corporation

Maintaining the Edge

Once a field force automation application is up and running, success factors change. Leading-edge companies considered the following most critical:

- Continual upgrading of hardware and software: 31% of respondents.
- Continual investment in training: 25%
- Ongoing support for end users: 20%
- Management support: 16%

This Insight was written independently by IDC and sponsored by Dell Computer Corporation. For a complimentary copy of IDC's full White Paper on Field Force Automation, please call Dell at 1-800-396-3040.

division. "In the past, people talked about how telecommuting was good for the employee." Now, he says, "I'm looking at it strictly for the bottom line."

The Virtual Office

Pacific Bell set up a department—Virtual Office Development—to organize telecommuting. One alternative they are investigating is a concept called *hoteling* (also known as *free address* or *territory-free office space*). The idea is to completely eliminate assigned work areas. People work from their homes, customer sites, in airports and hotels (when traveling), or in neighborhood telework centers. When they need to come to the office, they check in with a concierge who assigns them a desk and makes sure they get their calls at that location.

We used to see telecommuting as a flexible work option. There were very few departments that used it as a way to reduce office space.

Emily Bassman, Director of Virtual Office Development, Pacific Bell

"We used to see telecommuting as a flexible work option. There were very few [departments] that used it as a way to reduce office space," says Emily Bassman, director of virtual office development for Pacific Bell. Her department is rapidly changing that. But Bassman says her efforts are in the infancy stage: A few departments are sharing office space or hoteling, and some have done away with office space altogether. These efforts—along with better utilization of office space—have resulted in a 25 percent savings in real estate costs.

Dozens of other big companies are setting up similar plans. IBM, for instance, recently eliminated 22 million square feet of office space in the Northeast and consolidated their marketing and services staff into a converted warehouse in Cranford, New Jersey. According to Edward Barbini, communications manager for IBM in New York, "that's equivalent to eight Empire State buildings." The 400,000-square-foot Cranford site is designed on the hoteling principle and allows 850 people to share 200 desks.

Barbini says that IBM saved $70 million in real estate costs last year in the Northeast alone—much of it from hoteling and alternative approaches to office space.

"Big offices at IBM have gone the way of white shirts," quips Barbini. Cranford is IBM's biggest hoteling experiment so far, and it works so well the company plans to start similar programs elsewhere. This is a big switch for a company that helped define corporate culture in the American collective consciousness, and it points to both the benefits and dangers when telecommuting becomes a corporate mission.

The benefits are straightforward: When the corporation openly supports a telecommuting program, many problems faced by guerrilla telecommuters dry up. And when everyone is regularly working outside the office, people start looking for new ways to communicate.

The danger is that companies may *require* telecommuting. "It should not be mandatory," frets Rupert, "or people will feel they are being pushed out of the office." One reason is that while it's easy to identify jobs that can't be done remotely, it's harder to identify people who won't make good telecommuters. Some people don't like the isolation; others can't deal with the distractions: television, the refrigerator, a friendly neighbor, or a playful spouse or dog. And some workers see telecommuting as a possible substitute for child care. It isn't. These people usually know who they are, and some of these issues can be resolved through training or the use of neighborhood telework centers, but forcing these workers out of the office is unlikely to make them more productive.

"You don't become more competitive only by reducing cost. You do it by getting the best people and letting them work in the ways that are most effective for them," observes Franklin Becker, professor and director of the International Workplace Studies program at the Cornell College of Human Ecology. "Where you are has little to do with what you produce," says Becker. Today's corporate culture, he explains, is modeled after factory work. Employees clock in and managers watch them to make sure they are toiling at their designated positions. But in the information age, that model doesn't have to apply. The future of the workplace could be as different from the factory model as the factory is from the rural farming model that preceded it.

The IRS and Other Problems

As the workplace becomes more *virtual*, issues that seem minor now will doubtless become more important. For example, the issue of who ought to pay for the home office is bound to heat up. Many companies are willing to supply the equipment employees need to work at home, but most have not yet dealt with the issue of partial rent compensation. According to a U.S. Department of Transportation study on telecommuting, current tax laws could fuel that debate. If you work in your home office only a couple days a week, chances are you can't claim it as a tax deduction.

State tax laws might also make employers hesitate. Some states base income tax laws on where the work is done, not where the company is located. In one case, Ohio levied corporate franchise tax on an Indiana-based company because it had a single employee telecommuting across state lines.

Where There's a Motive, There's a Will

Despite these obstacles, companies are discovering that telecommuting offers human and economic advantages—justifications

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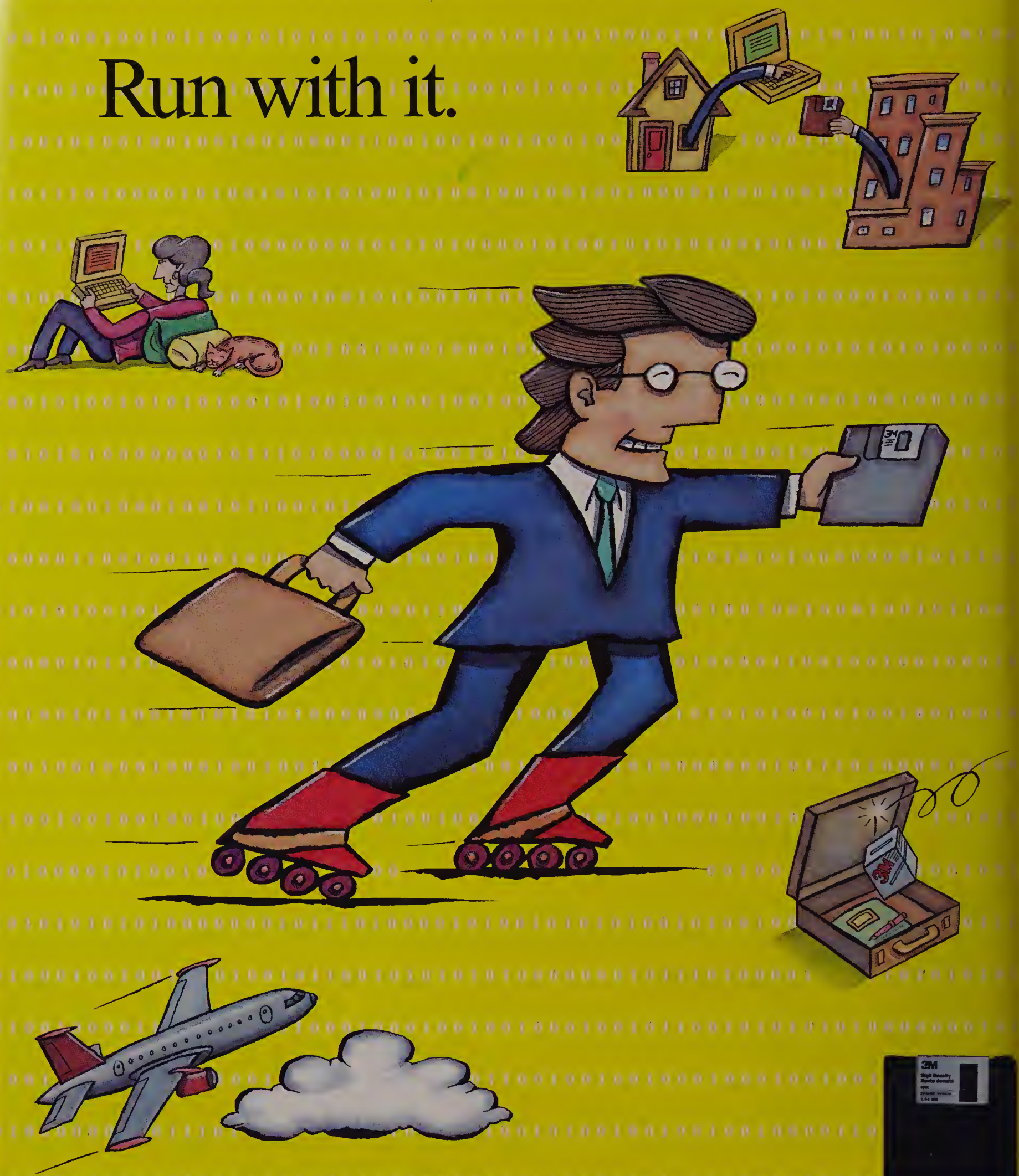

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Working Women: Changing the Way We Do Business

Workplace experts cite a litany of reasons for the growing interest in telecommuting and alternative work arrangements, but one critical factor is the changing role of women in the workplace—and their need to balance the conflicting duties of work and family life.

Though women are still underrepresented in senior positions—and overrepresented in low-paying jobs—the ranks of female middle managers and professionals have increased steadily over the last five years—by 5.1 million between 1983 and 1992, according to the Women's Bureau of the U.S. Department of Labor. That steady increase has brought many workplace issues to the fore, most notably the need to offer alternatives to the traditional 9-to-5 workday that has become the hallmark of U.S. businesses. Roughly 34 million women with school-age children are working, and domestic tasks that were once handled smoothly by stay-at-home moms have become logistical hurdles that mothers, fathers, and even employers find themselves jumping over. The result: Companies are adopting everything from flextime and telecommuting to on-site child care and elder care centers.

But don't think only the women benefit. "Women have opened a lot of doors, and men are walking through them," says Linda Marks, Director of the FlexGroup Project for New Ways to Work, a national not-for-profit advocacy group that focuses on education programs for flexible work arrangements. Many employers first investigate telecommuting as a way of keeping a valued female employee, such as a manager who's just had a baby. But the majority of telecommuters are male, says Arlene A. Johnson, vice president of the Families and Work Institute in New York.

Johnson describes telecommuting as the only flexible work arrangement that hasn't been feminized—that is, viewed principally as an accommodation to women. And unlike flextime, part time, or job sharing, telecommuting is gradually being viewed as simply a smart business move.

"Telecommuting appeals to both working men and women," Johnson says. "Employees are asking for policies that suit their lifestyles, and companies are seeing big benefits in recruitment and retention." She cautions, though, that it's one thing to institute a policy and another to change the way we view work and evaluate the jobs people do. She worries about the dark side of working at home, particularly for women already juggling chaotic work and family schedules. "It's important not to create an anytime, anyplace workplace," she notes. Rather than reducing stress and helping workers achieve greater balance in their lives, telecommuting could make it more and more difficult to separate work from our personal lives.

No one can argue with the convenience of working at home. But, as Johnson notes wryly, "there's nothing like packing up and going home to put an end to the work day."

—Roberta Furger

I get twice the work done in half the time because nobody bothers me.

Rachel Axelrad, Auditor, Southern California Edison

Companies are discovering that telecommuting is more than just a benefit that they can offer employees who have stressful schedules and long commutes. Employers are also beginning to see telecommuting as a way to remain competitive, cut costs, and save money. As corporate CEOs become aware of these advantages, they are bound to encourage or demand that telecommuting programs go into place at their companies. And as the practice spreads, it could influence more than just the way that you manage your employees and your work.

According to Ed Weiner, senior policy analyst with the U.S. Department of Transportation and the department's leading expert on telecommuting, "it will cascade into other parts of life. It may even get them to change their style of life." If people don't have to drive to the office every day, that could change the way they structure their lives, where they decide to live, and where the community develops.

It could also make companies leaner and more competitive: If people can't compete based on who stays at work the latest, what you do and how well you do it will become the primary concern. That benefits the entire company. It's a principle that's worked well for corporate—as well as human—evolution.

that far outweigh the stumbling blocks. Even the federal study determined that given the advantages, it would be worth changing the tax laws to create a hospitable environment for telecommuting.

Christina Wood is an associate editor and Roberta Furger a senior editor for PC World.

Gearing Up

Getting ready to telecommute doesn't mean spending a small fortune to outfit your home office. By choosing the right gear, you can stay as productive and informed as your office-bound associates at minimal cost. **By Randy Ross**

Ah, the joys of telecommuting: No traffic. No more interruptions from the pest in the next office. But before you begin to savor these thoughts, anxieties take hold like a case of hiccups. What about E-mail? What about those network apps? What will it cost?

Before you whip yourself into a high-tech frenzy, consider this advice from telecommuting guru Jack Nilles, author of *Making Telecommuting Happen* (Van Nostrand Reinhold, New York, 1994). To telecommute successfully, Nilles says, you need the same technology you use every day—such as a PC and phone—plus a handful of telecommunications tools to access the network and contact colleagues.

To help you get set up, we've outlined three types of telecommuters, each with different budgets and needs.

Scenario #1: The Lone Wolf

If you plan to hunker down in your home office one or two days a week, your needs will be simple: a PC and fax, a remote E-mail package, and a second phone line for faxes and E-mail. And if you need access to your office hard disk, you'll want software to control your office PC.

Popular E-mail packages like Lotus cc:Mail or Microsoft Mail offer remote versions for $195 per user (less if you buy a pack of ten or more). If your company doesn't already have remote users, your network administrator will need to set up a phone line, with a modem and a PC to act as a server for managing network traffic.

Unfortunately, E-mail is useless if you forget to send yourself the file you need. And it won't let you run apps that reside solely on the LAN server. That's where remote control programs like Microcom's Carbon Copy and Symantec's pcAnywhere come in handy. These $200 packages let you control your office PC from anywhere. You just leave your office PC turned on with the remote control package running in "host" mode (turn the monitor off to save on electricity bills). Then use the remote package on your home PC to dial in to the office PC. Once connected, you can grab files and run apps from your office hard disk or the LAN server. Best of all, you won't need any help from your company's network administrator.

Remote control software can be time-consuming to use and learn. It's also slow, so you'll want a fast modem. And if your job requires access to network databases, remote control software will be too slow. You'll need a product that lets your home PC pretend it's wired to the office net.

Scenario #2: The Collaborator

Not everyone works alone. But even when you collaborate or need to access the database, you don't have to hop into the car. Remote LAN packages and document collaboration software bring the office to you.

Remote LAN node products, like Shiva's Netmodem/E and DCA's Remote LAN Node, extend the office network over the phone lines. When you dial in, network servers appear as additional drives on your machine. You can access data, shuffle files, even print directly to the printer at work.

The downside? LAN node packages are faster than remote control software, but they're still slower than a direct connection to the net. They're also expensive and complex—you'll need your LAN administrator.

Like remote E-mail packages, LAN node software comes in two parts: a package that resides on your PC and another that installs in a communications server connected to the network. You'll also need a modem on each end, 9600 bps or better. Some vendors, like Shiva, bundle the modem and server into a single unit. The bundled products cost from $1700 to $10,000, depending on how many telecommuters each supports.

Tapping into corporate data is only half the battle—sometimes you simply must interact with co-workers. While there's no substitute for face-to-face collaboration, document conferencing products like Intel's $99 ProShare Personal Conferencing and FutureLabs' $199 Talkshow allow two users to see a common screen—often called a whiteboard—where they can annotate documents in real time. Need to go over sales figures with a colleague? Copy a range from a spreadsheet and paste it into the conferencing program, then have your co-worker launch the program. One of you dials up the other's modem, and both can view and annotate the spreadsheet. Intel's package is one-on-one, but FutureLab's Talkshow lets you work with several people.

Such products have their limits. The images are akin to faxes—you can mark them up, but you can't edit them. Someone has to make the changes later to the spread-

for Telecommuting

sheet. However, versions of these products that will allow two people to edit live documents should be available before year's end.

Scenario #3: The Executive Suite

Say you're an exec who wants to take part in meetings at corporate headquarters, or an engineer sending huge CAD files to the office. You need a high-speed connection.

Until the information highway is in place, ISDN (Integrated Services Digital Network) may be your best bet. It operates over regular phone wires but transmits nearly 10 times faster than a 9600-bps modem on standard phone service. It is sold by local and long-distance phone companies, so the cost varies. You'll also need specialized communication devices that run from $500 for a home device to $25,000 for one that hooks to the LAN.

While a digital phone service will speed up any connection, the sexiest application for it is video conferencing. With a video setup you can address a conference from the comfort of your den. Products like AT&T's TeleMedia Personal Video System and PictureTel's Live PCS 100 include add-in boards for each PC, conferencing software, a microphone, and a camera that mounts on the monitor. Rigs cost up to $6000 per seat, but Intel's $2499 ProShare 200 Video System can be had (with ISDN service) for $999 from Pacific Bell.

Don't expect miracles, though; video conferencing is in its infancy. On-camera movements and screen resolutions are hardly state-of-the-art, and much hardware is proprietary. One vendor's device may not work with another's. If you don't need the speed today, wait until the technology evolves.

The Bottom Line

New telecommuting products and technology appear every day. That doesn't mean you need to buy them. As always, evaluate what you need before you spend. If you use a PC in the office, you'll need one at home, but you may be able to get away with a less powerful setup. Convincing your company's controller to loosen the purse strings for fancy technologies may be a tougher sell. Your best bet is to start small and add gear as your needs grow. And when it's time to make a pitch for more expensive equipment, remember this from Nilles: "Given equal human and economic resources, the person with the technology best suited for the job wins."

Randy Ross is the East Coast editor for PC World.

For more information about all products in this article, circle reader service no. 908.

Profiles in Telecommuting

Tales from the Home LAN

Lisa Glinche, Director of Client Relations, Aurora, Colorado.

Company: Interlink Group, a Denver consulting firm specializing in integrated computer solutions. Fifty percent of Interlink's 80 employees telecommute. Glinche telecommutes one day a week.

Telecomputing needs: E-mail; access network applications.

Technology of choice: DCA's Remote LAN Node; Texas Instruments TravelMate 486-33 color notebook with 9600-bps modem.

Costs: Notebook, $3500; remote hardware and software, $1000; four modems for the server, $800; 80386 server, $1800.

Pros: Remote LAN node easy to learn and use, lets her run network-based custom time and billing program from home.

Cons: Very slow; tricky to configure.

Dialing for (Fewer) Dollars

Chuck Burchfield, Senior Technical Specialist and Telecommuting Project Manager, St. Louis

Company: Monsanto, a St. Louis chemicals manufacturer. Their two-year-old program now has 25 telecommuters. Burchfield telecommutes once a week.

Telecomputing needs: E-mail; access to office mainframe.

Technology of choice: Ocean Isle's Reach-Out Remote control software; standard phone line and two 19.2-kbps modems; terminal emulation software.

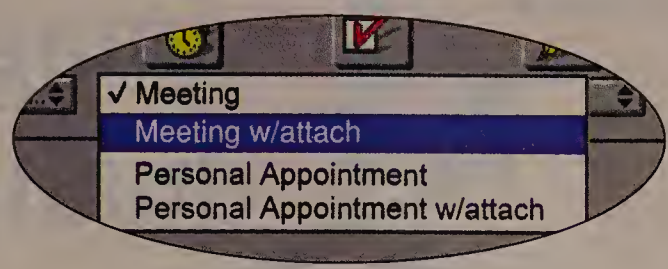
Cost: $500 for two 19.2-kbps modems and software. Burchfield uses his own 486.

Pros: Low start-up cost; remote control lets office PC perform most of the processing, so home PC can be less powerful.

Cons: Software is complicated to use.

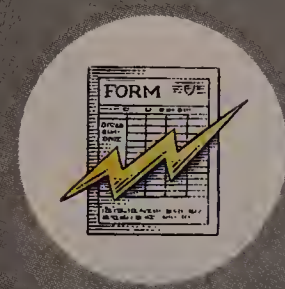
How to get eight people in the same conference room at the same time.

(Bagels and donuts not required.)



If you've ever tried to arrange a meeting, you know the degree of difficulty is somewhere between nailing a triple gainer with a half twist and eliminating the national debt. It's not for amateurs or the faint of heart. But all that's about to change. Introducing GroupWise 4.1, a new member in the family of Novell GroupWare. GroupWise capitalizes on the advancements of its predecessor—WordPerfect® Office 4.0—and offers features not found in any of its competitors. For instance, with the Busy Search feature of the integrated e-mail calendar/schedule program, you can quickly determine the best time for 8 (or 80) people to convene. Regardless of their locations or operating systems. More than message-based scheduling, GroupWise integrates task management, so you can delegate an assignment, track its acceptance and manage its completion before the first attendee arrives. With GroupWise, we've made it incredibly easy to set up a meeting. Of course, you still have the daunting task of keeping people awake in one. Call **1-800-370-8992** for your nearest certified reseller or to learn more about Novell GroupWare, the perfect way to put people together with information.

GroupWise 4.1—Comprehensive integrated e-mail, calendaring, scheduling and task management. GroupWise 4.1 enables you to share information across almost any platform, gateway or network.



InForms—More than an electronic forms program. Now you can create and design forms and views, access multiple databases in real time and, via e-mail, digitally sign forms requiring immediate approval.

SoftSolutions—The leader in document management solutions. You can secure information and access data (text, graphic or video) anywhere on the network, regardless of its application or platform.

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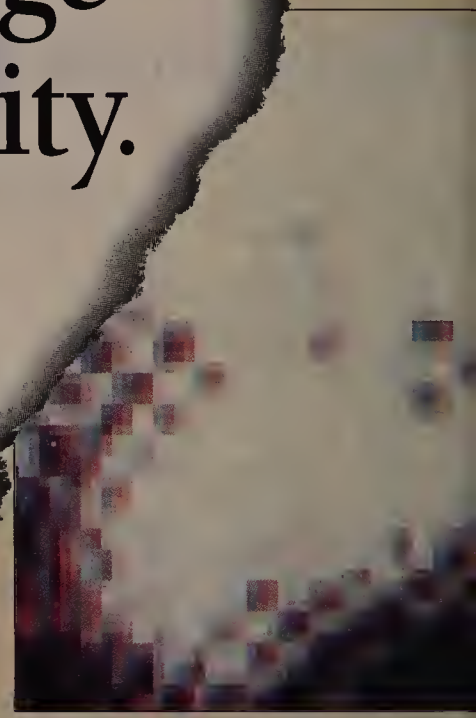
Let's talk scanned image quality.

Test 1

COLOR REGISTRATION ACCURACY



MICROTEK SCANMAKER IISP

A good test for RGB color registration is to scan black and white line art in RGB color mode. When magnified and displayed on the monitor you should not see red, green or blue pixels, only gray and black. Microtek's ScanMaker IISP image on the left shows no red, green or blue pixels. Hewlett Packard's ScanJet IIcx, however, shows too many red, green and blue pixels.

BEFORE YOU BUY ANY SCANNER, TAKE A GOOD, HARD

Before you lay down your hard-earned bucks for a single-pass color desktop scanner, here's a simple test you can perform to see for yourself how well it handles color registration.

Scan black and white line art in RGB color mode. Then enlarge and examine the results.

If the colors are properly aligned — or "registered" — the lines will look black. If you see dots of red, green or blue at the edge, the scanner's color registration leaves something to be desired.

SEE FOR YOURSELF.

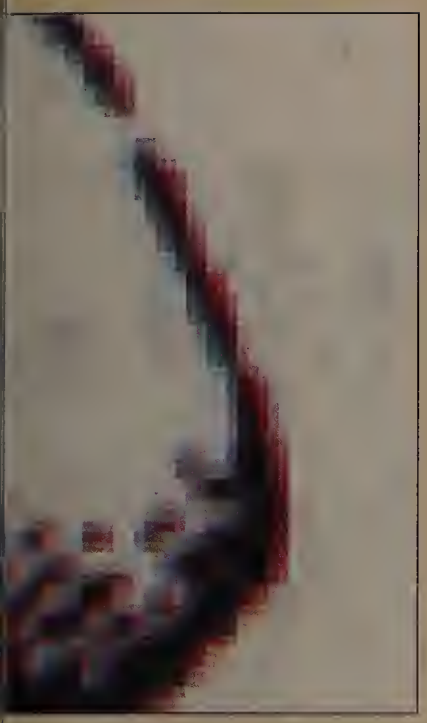
In a recent direct comparison between the Hewlett-Packard ScanJet IIcx and the Microtek ScanMaker IISP, the ScanMaker clearly shows superior color registration. The H-P ScanJet IIcx, well, leaves something to be desired. And because poor registration is only one factor that causes inaccurate color, it further degrades color quality when accuracy problems already exist. So color registration is only one of the quality checks you should be making if you want the best scanner for your money.

Another is color accuracy — how close does the color of the scanned image come to the color of the original? The Microtek ScanMaker IISP uses an award-winning system called Dynamic Color Rendition (DCR) which automatically calibrates and

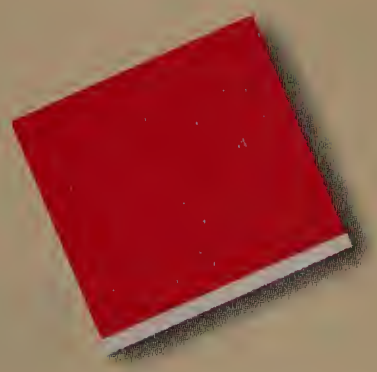
The scanner to ask for, **Microtek's ScanMaker IISP**, *comes complete with Adobe Photoshop LE for Windows or Macintosh and the DCR color calibration/correction system including software and an IT-8 calibration target. Shown with optional Transparent Media Adapter. Optional Automatic Document Feeder also available.*

Test 2

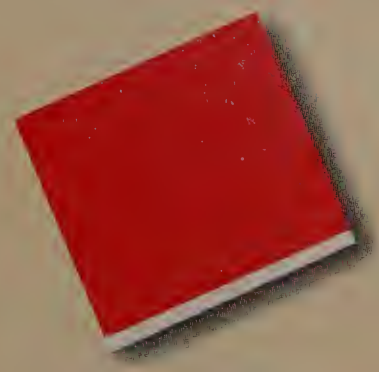
COLOR ACCURACY



H-P SCANJET IICX



PROCESS MAGENTA



A WARM RED

MICROTEK IISP H-P IICX

MICROTEK IISP H-P IICX

Color accuracy is important in most of the images we scan. To test color, we scanned color swatches from an industry standard color-matching system. Once again, Microtek's ScanMaker IISP easily outclassed the well-known ScanJet. The disparity is even more apparent when the Transparent Media Adapter is used. H-P's stationary "light table" light source results in uneven accuracy, while Microtek's moving light source gives consistently more accurate color.

LOOK AT REGISTRATION AND COLOR ACCURACY.

corrects colors to make them virtually indistinguishable from the original.

To prove it, we scanned a 100% magenta color swatch on the ScanJet IIcx and the Microtek ScanMaker IISP. The results, as you can see, show the ScanMaker IISP's color accuracy is superior to H-P — or anyone else. In fact, in a scanner comparison published in the February 8th edition of *PC Magazine*, the editors said, *"...the ScanMaker IISP's color output was clearly the best of any scanner in our survey."*

PC MAGAZINE EDITORS' CHOICE™
February 8, 1994
Microtek ScanMaker IISP

SOMETHING ELSE H-P CAN'T SAY.

Hewlett-Packard makes some great printers. They also make computers and a host of other electronic equipment.

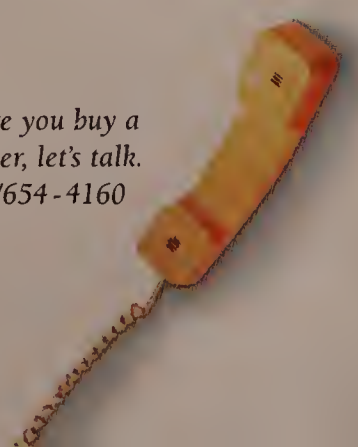
Microtek makes scanners. Period. In fact, Microtek pioneered desktop scanners. So our history with scanners is longer and deeper than anyone else you can name. Including H-P.

DON'T BUY A SCANNER UNTIL...

If you're considering a scanner — anybody's scanner — don't write the check until you've seen the Microtek ScanMaker IISP. For your free copy of *The Scanned Image* (an easy introduction to scanners), more information or to find out where to see the IISP for yourself, call us at **800/654-4160** or fax a request to 310/297-5050.

MICROTEK
Better Images Through Innovation.

Before you buy a scanner, let's talk. 800/654-4160



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Prices and software bundles are subject to change. Test results may vary with specific company products. SM11SP-PCW-894

Circle 195 on reader service card

WHAT HAPPENS WHEN YOU ADD SIZE TO AN ALREADY EXTRAORDINARY PACKAGE?

At 7 feet 2 inches tall, Kareem Abdul-Jabbar has got some serious size. But that's only half the story. The fact that he added superior basketball skills to an already imposing frame is what made him a dominant force in the NBA for two solid decades.

The new ergonomically and aesthetically designed Elite series of monitors from MAG InnoVision have features that other monitors just can't touch. And the fact that they only come in the larger 15-inch, 17-inch and 21-inch sizes with the most advanced CRT technologies makes them truly fantastic. Advance Display Calibration, Green Energy and LCD displays combined with ultra high resolutions up to 1600 x 1280, lightening-quick refresh rates and crystal clear dot pitches make them impossible to beat. And since they're so reliable, we'll even throw in a 3-year limited warranty.

So pick one up at a MAG InnoVision dealer near you. Their larger size and imposing features are liable to dominate the market for years to come and they cost a lot less than, say, an NBA draft pick these days.

WHAT DO YOU THINK?

See Kareem at COMDEX/Fall '94, Booth #L290.

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It's a buyer's market as prices drop sharply on Pentiums, DX2s, and DX4s.

This month's best: Dell Dimension XPS P90, Diamond DT 486-66, Compaq LTE Elite, and IBM ThinkPad 500.

TOP 20 PCS

PRICES PLUNGE, PERFORMANCE CLIMBS

This Month's Contenders pg. 167 • Power Desktops pg. 168 • Budget Desktops pg. 174 • Mobile PCs pg. 182

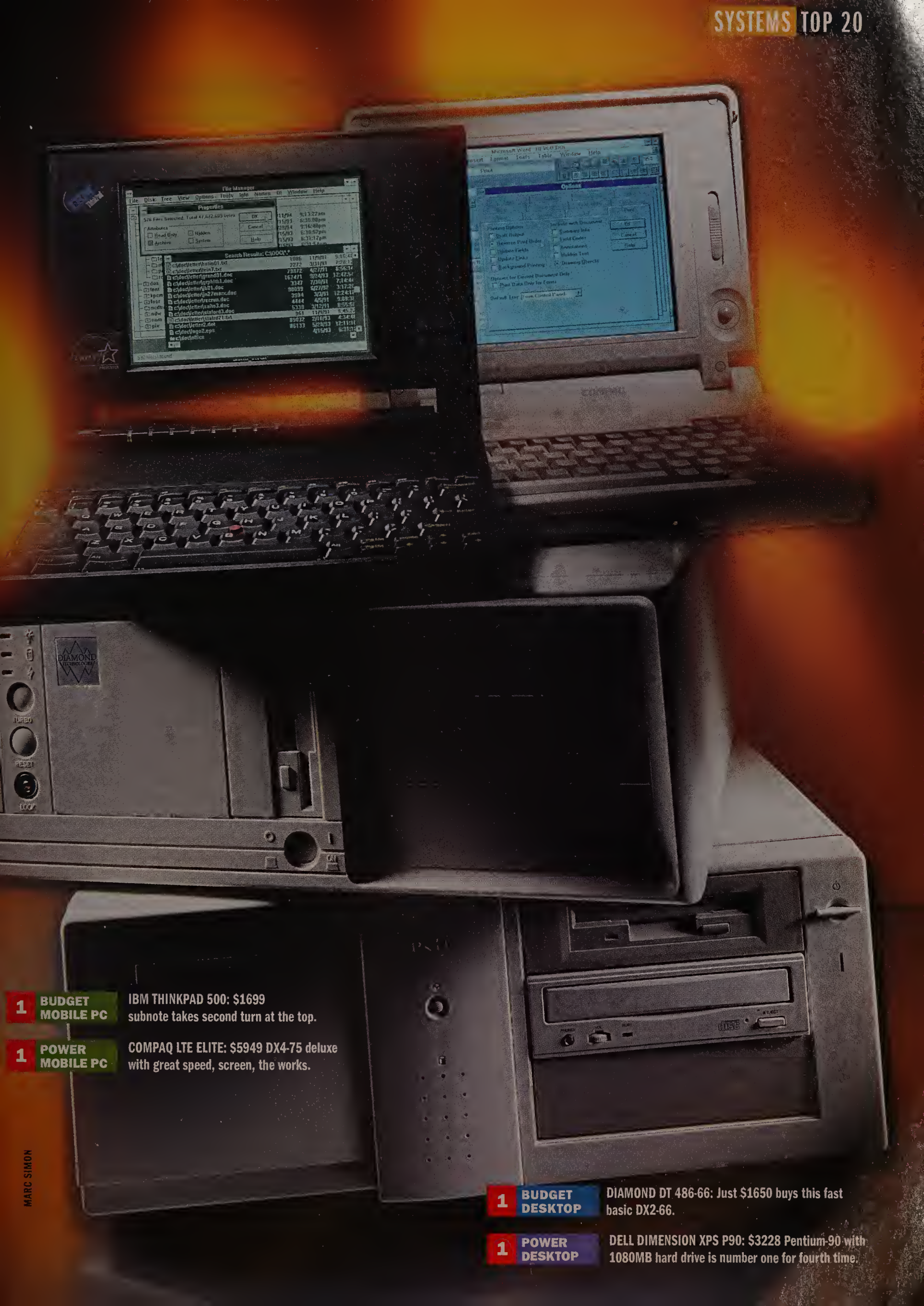
These days it takes a bigger and bigger ante to earn a seat at our Top 20 tables. It's astonishing to realize that an IBM system that rated a power desktop Best Buy for six months running now nets a spot near the bottom of the chart—despite an $850 price drop in the last two months. In this buyer's market, only players with the most complete package of low price, high performance, full features, and solid service and reliability win Best Buys. Good overall PC values now often show up in *System Snapshots*.

Cost counts heavily in the PC game, and this month prices are on the move—straight down. Deep cuts on the power side were led by the Micron P90PCI PowerStation, reviewed in August. This Pentium-90's price, with 32MB of RAM and a 540MB hard drive, fell $940 in one month to a mere $3659. Dell's Dimension XPS P90—a four-time power desktops number one with a 1080MB hard drive—came down $600 this month to $3228. And new hot deals are showing up too, such as Zeos's $2990 Best Buy power desktop Pantera DX4-100—with speed rivaling a Pentium-90's—and Gateway's well-configured P5-60 Pentium-60 PC, a strong $2459 Best Buy budget desktop.

Performance keeps improving as well. This month the Ambra MediaPro 90 and Austin P90 Pentium-90s tallied benchmark scores surpassing the former power desktop high—over 100 on our ratings scale. On the Budget Desktops Top 20 for last month, just two systems were speed-rated at 70 or above.

BY REX FARRANCE

Testing by Dean Andrews, Ulrike Diehlmann, and Susan Silvius; research and support by Mike Salayko.



1 BUDGET MOBILE PC IBM THINKPAD 500: $1699 subnote takes second turn at the top.

1 POWER MOBILE PC COMPAQ LTE ELITE: $5949 DX4-75 deluxe with great speed, screen, the works.

1 BUDGET DESKTOP DIAMOND DT 486-66: Just $1650 buys this fast basic DX2-66.

1 POWER DESKTOP DELL DIMENSION XPS P90: $3228 Pentium-90 with 1080MB hard drive is number one for fourth time.

MARC SIMON

Currently five budget desktop PCs rate 70 or above—topped by the fiery Poly 586-66V1's remarkable 93! And this month eight notebooks rated 40 or higher on our Power Mobile PCs Top 20, compared to last month's six.

So the trend holds: You can buy more power and features for the same or less money. Last month six Pentium-90s made our Power Desktops Top 20; this issue ten Pentium-90s (costing $300 less, on average) have half our Power Desktops Top 20 locked up. And this is the first time no DX2s appear on our Power Desktops Top 20.

Memory and storage grows by the month: An impressive 16 power systems feature 16MB or more of RAM. And just one power machine has a hard disk as small as 270MB, while 16 systems provide 510MB or bigger hard drives. On the Budget Desktops Top 20, all the PCs but one come with 8MB or more of RAM. Eleven budget machines have 340MB or larger hard drives.

The budget desktops balance of power is tipping. The 486DX2-66 appears in over half the Top 20 positions. But germinating low-cost DX4 and Pentium seeds will thrive and ultimately choke out the DX2s. Three DX4-100s and three Pentiums under our $2500 limit make our Budget Desktops Top 20. One, the $2460 Polywell Poly 586-66V1, is our first budget Pentium-66.

The DX4-75 processor is the top power mobile CPU—for now—running in seven of the ten best power mobile PCs. This month, we review our first mobile DX4-100, the Aspen Universa Series E. It's the fastest mobile PC—with one of the shortest battery lives—we've ever seen. Reviews of even more powerful Pentium notebooks appear next month.

Personal computing isn't all spreadsheets—as illustrated by the $3899 Ambra MediaPro 90, which is the fastest PC we've tested, bar none, and a strong Power Desktops Top 20 contender. This machine adds a nifty twist to the multimedia PC, allowing you to capture and display video images in large windows, accelerate playback of video clips, hook up to a VCR, and even use digital or video cameras in place of color scanners. *(At press time we learned that under IBM restructuring, Ambra will cease operations this fall. Ambra says it will sell products reviewed here until the end of October, with IBM providing ongoing warranty and tech support. —Ed.)*

New Best Buys: Power on a Budget

Power desktops winners reviewed here include the number two Best Buy Zeos Pantera DX4, which combines 16MB of RAM, a 530MB hard drive, a low $2990 price, and a performance rating exceeding that of any DX4-100 yet tested. The number three power desktops Best Buy Quantex QP5/90PM-1 offers an excellent balance of generous features, fine Pentium-90 performance, and an attractive $3069 price. The last Best Buy from this month's new desktop PCs is the Gateway P5-60, configured with an optional 64-bit ATI graphics adapter. The P5-60 combines good Pentium-60 performance, a $2459 price, and a solid configuration, to earn the number three position on the Budget Desktops chart.

Two new systems are power winners in our Top 20 Mobile PCs. The fast $5949 AST Ascentia 900N earns a strong number two Best Buy, with a DX4-75 CPU, 8MB of RAM, a 510MB hard drive, a beautiful active-matrix color display, and an amazing 6¾ hours of battery life. The even-faster $5949 Compaq LTE Elite is the number one power notebook. This DX4-75 has it all: 8MB of RAM, a 340MB hard drive, a lovely active-matrix color display, a long 6½-hour battery life, auto-configuration of PCMCIA cards, and a weight just over 7 pounds with integrated power supply.

More Systems Every Month—Fresh Service and Reliability

We're always looking for ways to make our Top 20s better. So we're bumping up coverage by 10 machines this month to a total of 35. Because of limited space, we give full reviews, features comparisons, and test reports only on the 20 highest-ranked PCs for the month. The others get short *System Snapshots*. This month we also update our service and reliability ratings based on the continuing influx of responses to our Reliability and Service Monitor.

Rex Farrance is an associate editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).* PC World *staff members Mike Desmond, John Goddard, Anita Hamilton, Caroline Jones, Owen Linderholm, Melissa Riofrio, and Susan Silvius contributed to this article.*

Call 900/903-2972 and use the fax reprint numbers to order an instant fax of up to three individual systems' capsule reviews or one capsule plus features table and test reports ($4.95). To order a month's complete review from the past six months ($9.95 each), enter the number for that month: December 3012; January 3001; February 3002; March 3003; April 3004; May 3005; June 3006; July 3007; August 3008; September 3009; October 3010. For a list of all systems tested by the PC World Test Center for the Top 20s ($4.95), enter 7. Touch-tone phone required; charges appear on your telephone bill.

For more information about all products in this article, circle reader service no. 906.

Buying Smart: Consumer Tips

Leave room to add drives. **If your new PC comes with no tape backup or CD-ROM drive, make sure you have free externally accessible bays to add less-expensive internal units.**

Make a deal. **Vendors and dealers often leave sales reps room to bargain—so make it clear you want to cut a deal. Calls toward the week's or month's end are most likely to catch sales agents needing to meet quotas.**

Fight flicker with 70-Hz refresh. **Make sure new monitors support a 70-Hz vertical refresh rate at your chosen resolution. That rate eliminates perceptible flicker for most people.**

Use a credit card. **Unless you already have a credit arrangement with the vendor, make all your orders using a credit card. In the case of a dispute, the credit card company can mediate or give a refund if you don't receive the product.**

This Month's Contenders

Our look at this month's contenders for the Top 20 Power and Budget Desktops and the Top 20 Mobile PCs. Icons show where systems placed on the Top 20 charts.

AcerAcros 486DX2/66

PROS: Low-priced multimedia setup, 24-hour tech support
CONS: Limited expandability, 14-inch monitor

This solid budget multimedia system won't make you swallow a hard compromise on speed: With 8MB of RAM and 256K of secondary cache, its performance is typical of 486DX2-66 multimedia systems. You get a 420MB hard drive tucked inside a compact case, along with a CD-ROM drive, a sound card, and speakers. Acer adds in a suite of Microsoft CD-ROMs, including Works, Encarta, Cinemania, and Golf, and wraps up the software package with Quicken's Intuit, Phoenix's MicroFax, and a diagnostics utility. The $2099 price for all these goodies may surprise you.

Acer

The picture isn't perfect, however. There's an adequate integrated 1MB VLB graphics adapter, but the monitor supplied at this price is just a 14 incher. Expandability is limited, with only two 16-bit slots free and one free externally accessible drive bay. The system's first 4MB of RAM is permanently attached to the motherboard, and the remaining 4MB occupies one of two SIMM sockets. By adding a 16MB SIMM, you can achieve a 24MB RAM configuration without having to swap out the installed 4MB module. This system's 36MB RAM limit is lower than the maximum we see on most DX2-66s these days, but it should be more than enough for typical business and home multimedia computing. Acer throws in a basic internal 2400/9600-bps fax-modem.

Acer provides a one-year warranty with free on-site service and 24-hour technical support. If you can live within this system's limitations, the Acros is a decent multimedia setup, although it doesn't quite make it into our Budget Desktops Top 20. *Acer America, 800/848-2237, 408/432-6200* **Reader service no. 761**

ALR Evolution V ST/90

PC WORLD TOP 20
10 POWER DESKTOP

PROS: Excellent support, fast **CONS:** None

ALR machines tend to impress with their exceptional performance, high expandability, and superior components, and the Evolution V ST/90 is no exception. This $3996 medium-size tower is the ALR Evolution V family's newest and fastest member—a Pentium-90, it's perfectly suited for power-hungry applications, with 16MB of RAM, 256K of secondary cache, and a 540MB hard drive.

This system's performance is nothing short of explosive, comparing well with that of the fastest Pentium-90 machines. But great performance is only part of the story. The ALR's BIOS supports Enhanced IDE, so you can hook up as many as four IDE devices, including jumbo hard disks and tape and CD-ROM drives. The expandability picture is equally good. RAM is upgradable to 264MB. There are four free drive bays (three externally accessible), one free PCI and four free 16-bit slots, and another slot that accepts either a PCI or a 16-bit card.

The graphics controller is a next-generation 64-bit ATI Mach 64 PCI card with 2MB of VRAM, and the 15-inch monitor is a solid choice for most business apps. The Evolution V ST/90 has been carefully designed with many layers of security, including a locking external panel over the drive bays and a chassis switch to keep out the unauthorized. There are also three levels of password security.

ALR

Service policies are very good. The company's five-year parts and labor warranty is fantastic, and on-site service is just $9.95 for the first year. Toll-free technical support is available 12 hours on weekdays and 6 hours on Saturday. The ST/90's outstanding speed, innovative technology, and superb warranty plant this system firmly in the Power Desktops Top 20. *Advanced Logic Research, 800/444-4257, 714/581-6770* **Reader service no. 762**

Ambra D4100BL

PROS: Good performance, 700MB hard disk, multimedia configuration
CONS: Seven-day turnaround policy on factory repairs

The Ambra D4100BL features IBM's 100-MHz clock-tripled Blue Lightning processor, which provides a 16K internal cache but no integrated coprocessor. With 16MB of RAM, 256K of secondary cache, and a separate math coprocessor installed, the system's performance ranked well above that of the typical Intel 486DX2-66 but a bit slower than the typical Intel DX4-100's.

Ambra D4100BL

For the price of $2499 you get a solid multimedia configuration with a number of extras: For example, the D4100BL comes with a 700MB Enhanced IDE hard disk. There's one internal and one externally accessible bay free in the system's compact case. The LMSI CD-ROM drive connects via a proprietary adapter on a 16-bit Media Vision Pro Audio 16 sound board. The 32-bit 2MB local bus video adapter is integrated, and one VLB slot and three 16-bit slots are free. The system also includes speakers, a 15-inch monitor, and an enhanced parallel port.

Although the CPU and coprocessor are permanently connected, Ambra does provide a 238-pin Intel ZIF socket that accepts any Intel 486 chip as well as the 100-MHz DX4. Considering the solid Blue Lightning performance, however, we see no point in filling the socket with any upgrade available today.

Support policies match the Media Pro's—decent but, aside from the 24-hour tech line, nothing special. Still, this is a nicely tuned

THE PC WORLD TOP 20

POWER DESKTOPS

1 Dell Dimension XPS P90
Pentium-90 with 1080MB hard disk.

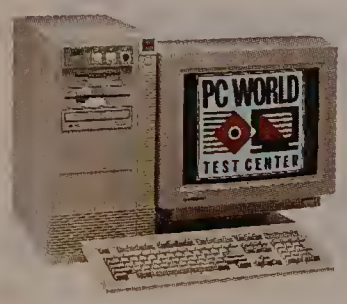
New this month · Up from last month · No change from last month · Down from last month

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	Dell Dimension XPS P90	1	4	96	93	72/79	$3228	Pentium-90	16	1080	ISA, PCI
2	Zeos Pantera DX4-100	–	1	93	95	68/75	$2990	DX4-100	16	530	ISA, PCI
3	Quantex QP5/90PM-1	–	1	93	96	69/77	$3069	Pentium-90	16	540	ISA, PCI
4	Zeos Pantera 90	2	3	91	102	68/75	$3495	Pentium-90	16	530	ISA, PCI
5	Micron P90PCI PowerStation	11	3	91	98	69/82	$3659	Pentium-90	32	540	ISA, PCI
6	Austin P5-66	3	2	90	94	68/76	$3298	Pentium-66	16	525	ISA, PCI
7	Austin P90	–	1	90	106	68/76	$4795	Pentium-90	16	1065	ISA, PCI
8	Ambra MediaPro 90	–	1	90	109	62/65	$3899	Pentium-90	16	700	ISA, PCI
9	Gateway P5-60	–	1	90	80	69/72	$2459	Pentium-60	8	540	ISA, PCI
10	ALR Evolution V ST/90	–	1	89	99	73/74	$3996	Pentium-90	16	540	ISA, PCI
11	Polywell Poly 586-66V1	–	1	89	93	64/70	$2460	Pentium-66	8	420	ISA, VLB
12	Zeos Pantera 66	4	5	88	89	68/75	$3195	Pentium-66	16	530	ISA, PCI
13	Micron 4100PCI Magnum	12	3	88	80	69/82	$2249	DX4-100	8	420	ISA, VLB
14	Polywell 586-90VIP	10	3	87	99	64/70	$3512	Pentium-90	16	540	ISA, PCI
15	Gateway P5-90	5	4	87	92	69/72	$3830	Pentium-90	16	540	ISA, PCI
16	Gateway P5-66	7	5	86	83	69/72	$3430	Pentium-66	16	540	ISA, PCI
17	NEC Image 4100es	6	2	86	88	75/72	$3813	DX4-100	16	540	ISA, VLB
18	IBM PC Company ValuePoint P/60D	9	9	86	80	76/74	$3849	Pentium-60	16	425	ISA, PCI
19	DECpc XL590	8	2	86	97	76/74	$5098	Pentium-90	16	510	ISA, PCI
20	MIS M5P/60	45	2	86	66	78/84	$2700	Pentium-60	8	270	ISA, PCI

[1] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to three individual systems' capsule reviews or one capsule plus features table and test reports ($4.95); a complete month's review ($9.95 each; January 3001, June 3006, July 3007, August 3008, September 3009, October 3010); and a list of all

2 **Zeos Pantera DX4-100**
DX4-100, fast as a Pentium-90.



3 **Quantex QP5/90PM-1**
Loaded Pentium-90 for $3069.

4 **Zeos Pantera 90**
Ultrahot Pentium-90.

5 **Micron P90PCI PowerStation**
$3659 Pentium-90, 32MB RAM.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Comments
15"/.28	800/289-3355	July 94	3113	Pentium-90 with top-notch mix of power, features, and price is a four-time no. 1.
15"/.28	800/554-5220	current	3140	Top-rated DX4-100 is as fast as many Pentium-90s for a lot less money.
17"/.26	800/288-0566	current	3141	Loaded with multimedia features, it's also the cheapest Pentium-90 on the list.
15"/.28	800/554-5220	Aug 94	3123	One of the fastest systems we've tested, at a great price.
15"/.28	800/438-3343	Aug 94	3124	$940 price drop lifts this Pentium-90 with gobs of RAM to Best Buy status.
15"/.28	800/752-1577	Sept 94	3132	Pentium-66 is faster than several 90s and full of features.
17"/.28	800/752-1577	current	3142	Second-fastest system, with extras like a 17-inch monitor.
17"/.28	800/252-6272	current	3143	New land-speed record holder has loads of features, including built-in video capture ability.
15"/.28	800/846-2000	current	3144	Another Pentium under $2500. More RAM would help performance slightly. No. 3 on Budget Desktops chart.
15"/.28	800/444-4257	current	3145	Fast Pentium-90 with standard desktop features.
15"/.28	800/999-1278	current	3146	First Pentium-66 under $2500, could use more RAM. Also no. 11 on Budget Desktops chart.
15"/.28	800/554-5220	June 94	3091	Zeos Pentium-66 has solid power configuration.
14"/.28	800/438-3343	Aug 94	3125	Low-price DX4-100 is a solid value. Also no. 2 Best Buy on Budget Desktops list.
15"/.28	800/999-1278	Aug 94	3126	Fast Pentium-90 with decent configuration.
17"/.26	800/846-2000	July 94	3114	Powerful graphics workstation with big 17-inch monitor.
17"/.26	800/846-2000	June 94	3093	Cheaper but slower version of Gateway Pentium-90 just above.
15"/.28	800/632-4636	Sept 94	3133	Fast but expensive DX4-100.
15"/.28	800/772-2227	Jan 94	3041	IBM quality, service, and reliability meet in basic Pentium-60. On Top 20 for nine months.
17"/.26	800/722-9332	Sept 94	3134	Fast, high quality, and loaded with features.
15"/.28	800/733-9188	Sept 94	3147	Basic Pentium workstation at a decent price. Big jump in MIS service rating helps it onto Top 20.

systems tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone phone required. Charges will appear on your telephone bill.

multimedia system with fine performance. *(See introduction for late-breaking information about Ambra availability. —Ed.) Ambra Computer, 800/252-6272, 919/713-1550, 800/772-2227 (IBM)*

Ambra MediaPro 90

PC WORLD TOP 20 8 POWER DESKTOP

PROS: Top performance, video-capture graphics adapter, multimedia setup, 700MB hard drive
CONS: Seven-day turnaround policy on factory repairs

Make way for another record-setter—the Ambra MediaPro 90, the fastest PC we've ever tested. Rampaging through our benchmarks more than 10 percent faster than the typical Pentium-90, this minitower system set new *PC World* records on the Word for Windows, Excel, 1-2-3 for DOS, and Paradox for DOS tests. With that kind of performance and a full-house multimedia configuration—including video-capture capabilities—this system is a compelling buy for home or business power users.

This kind of power doesn't come cheap, but $3899 isn't bad for a system with 16MB of RAM (128MB max), 256K of secondary cache, a hefty 700MB Enhanced IDE hard drive, an LMSI CD-ROM drive, a Media Vision Pro Audio 16 sound card, and speakers. You also get a 17-inch monitor, along with the kicker—a 2MB Ambra PCI TrueVideo adapter. The latter lets you capture video images and has a video processor that stretches video images to 720 by 512 in true color and accelerates video playback without tying up the CPU. Furthermore, you can hook up the Media Pro to a VCR, camcorder, digital camera, laser disk, and so forth, and even use a digital camera or camcorder as a substitute for a color scanner. The TrueVideo card conforms to the Microsoft Video for Windows and Intel Indeo standards. Ambra throws in nifty multimedia tools on CD-ROM: For example, Media Studio from Ulead Systems provides advanced multimedia functions such as morphing and video editing.

Ambra MediaPro 90

Expandability is solid, with one PCI and three 16-bit slots free, another slot you can fill with a PCI or a 16-bit card, and four free drive bays (two externally accessible). Ambra support is decent if not outstanding, with a basic one-year warranty and a 30-day money-back guarantee. A year of on-site service costs just $29. Documentation is excellent, and you get round-the-clock IBM tech support. This fine PC provides big performance, plenty of storage, and amazing multimedia capabilities. *(See introduction for late-breaking information about Ambra availability. —Ed.) Ambra Computer, 800/252-6272, 919/713-1550, 800/772-2227 (IBM)*

Ares PCI/VESA

PROS: Combination local bus, multimedia **CONS:** So-so performance

The Ares PCI/VESA gives you impressive flexibility by combining ISA, VLB, and PCI expansion slots on its motherboard. Even with a VLB hard drive adapter and a PCI graphics accelerator already installed, you get one VLB and two PCI slots, plus one for a PCI or a 16-bit card. The system has a 486DX2-66 CPU, 8MB of RAM (128MB max), 256K of secondary cache (512K max), a 420MB hard drive, and a BIOS that supports Enhanced IDE. The 2MB 32-bit PCI graphics card supports resolutions up to 1024 by 768 noninterlaced—as does the 15-inch monitor. Ares says a 64-bit version will be shipping with the system by the time you read this. Performance was far short of impressive, particularly on the 1-2-3 test, but $2195 is a good price for a flexible multimedia PC.

Ares

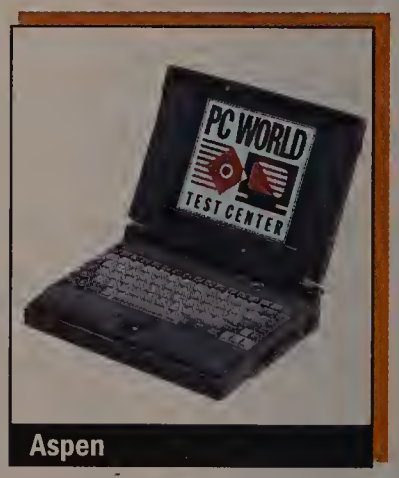
What the PCI/VESA lacks in horsepower it makes up in features. Ares throws in a basic internal 2400/9600-bps fax-modem and an America Online start-up kit. A Mitsumi proprietary-interface CD-ROM drive and a 16-bit Sound Blaster–compatible sound board are the heart of the multimedia setup, and Compton's Interactive Encyclopedia is included.

Ares's recently improved support policies are outstanding, including a three-year parts warranty with free labor for the life of the system, a 60-day money-back guarantee, and a year of free on-site service. The multimedia components and software make this unit a prime candidate for home use. *Ares Microdevelopment, 800/322-3200, 810/473-0808* **Reader service no. 765**

Aspen Universa Series E

PROS: Excellent performance, good screen and pointing device
CONS: Very short battery life, deficient power management

The Aspen Universa Series E has much of what it takes to turn a traveler's head, including a powerhouse CPU, a really good dual-scan color screen, and a great pointing device. And the $3495 price is compelling for a notebook with 8MB of RAM (36MB max), 128K of secondary cache, a 340MB removable hard drive, and local bus video with 1MB of memory. But this note burned up its full charge in just 1¾ hour. We can only speculate that power management (our test system provided next to none) would extend battery life. As it is, the DX4-100 CPU and secondary cache gulped energy by the gallon.



Aspen

This mobile PC's performance is the best we've seen in a notebook, providing a significant edge over the typical DX4-75's. Aspen installs what some vendors describe as a PCMCIA "Type IV" slot. While there's no official standard for these slots, they're taller and can accept peripherals (such as some hard drives) that won't fit Type III slots.

Traveling weight is a heavy 8.6 pounds. But the dual-scan display provides rich colors and strong contrast. You get 8-bit sound and an integrated speaker. The large trackball centered in the palm rest is outstanding, providing tactile feedback and comfortably angled buttons.

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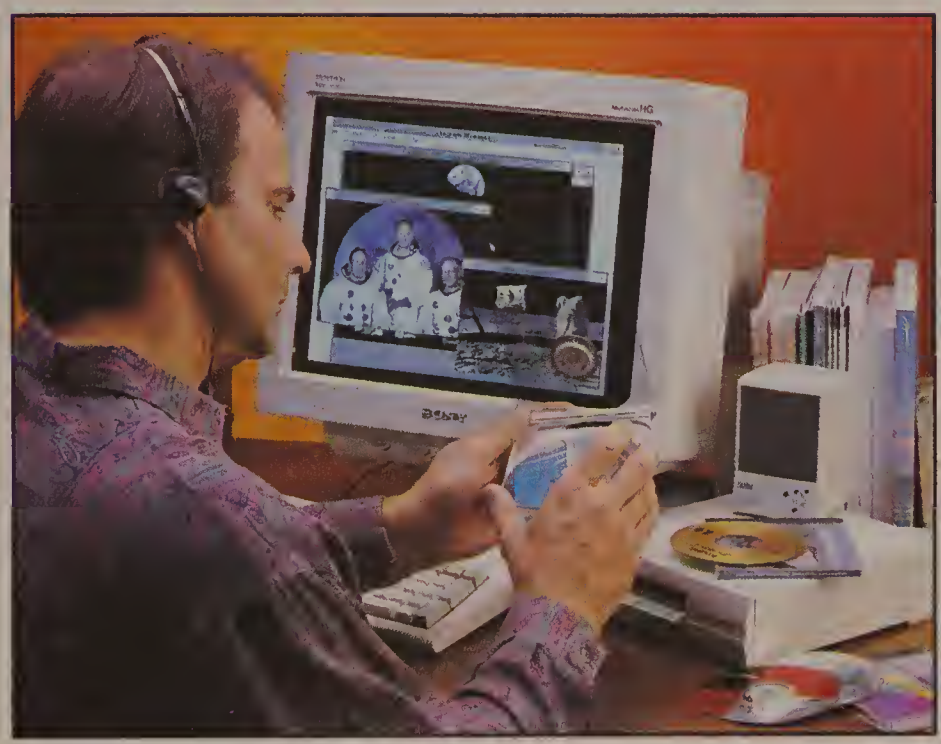
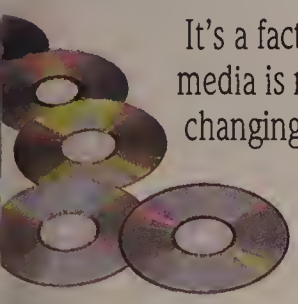
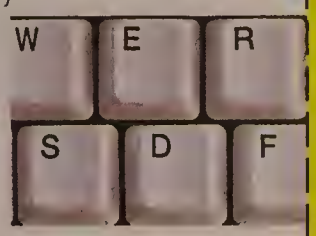


Multimedia. It's cutting edge technology that's being talked about everywhere — in magazines, on TV, even at your office. Perhaps you've used a multimedia application yourself at an airport kiosk or in a retail store. Now you can be a part of this fascinating new technology that's given the PC voice, sound, animation, and even full-motion video!



It's a fact: Multimedia is rapidly changing the way we learn, communicate, get information — even the way we do business. Only NRI gives you exclusive, hands-on training with the latest peripherals that turn your present computer into a "Multimedia PC" and turn you into a Multimedia Specialist. Only NRI prepares you so well to take advantage of the myriad career opportunities opening up in this dynamic new field. Whether you're looking to create programs that educate, inform, entertain, or train, opportunities to move up, make more money, even start your own business are virtually unlimited.



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Your Multimedia Training Includes Everything You Need to Create Multimedia Applications With Your Own Computer

See other side for more details →

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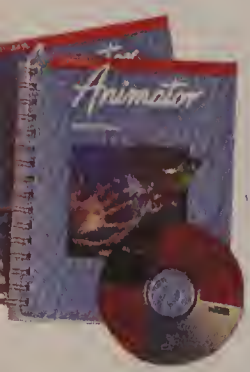
Get in on the ground floor of today's most dynamic computer technology: Multimedia

Your very first lesson has you and your computer up and running with a review of the many opportuniutes in the exciting field of Multimedia. But before you begin to design your own program, you first learn about the various types of multimedia applications and CD-ROM titles that have been developed commercially. With a full understanding of the elements that make up a successful multimedia application, you're ready to try your hand at your own multimedia program. Using your own computer and the exclusive worksheets and sample reports included in your hands-on training projects, you prepare an Analysis Report and Preliminary Design Document that lay the foundation for your own multimedia program.



With your NRI instructor available to guide you every step of the way you move on to examine the components that combine to make your multimedia program visually engaging: text, graphics, video, and animation. You install Autodesk Animator software on your computer and then use its paintbrush feature to create objects that move across the screen, rotate, or change perspective, keeping in mind the creative approaches you will use later in your multimedia program.

Now you're ready to go on to explore the elements of multimedia that make it multisensory: audio and video. Your lessons cover the breakthrough technology of CD-ROM and new digital data storage devices on the horizon. Then you get first-hand experience with the very equipment that enables your computer to speak, play music, and generate a host of sound effects — Mitsumi CD-ROM drive, 16-bit SoundBlaster Pro-II-compatible sound card, speakers, headphone, microphone, and software — all yours to train with and keep.

Your multimedia program takes shape as you learn about interactivity and principles of interface design. You put yourself in the user's shoes: What will make your program exciting so that people will want to use it? What will your interface buttons look like? How will they work? Refer back to your Preliminary Design Document, and you'll find many of the answers you need to help you create detailed flowcharts and storyboards of your program design on paper. Then, using the Flowchart software included in your course, you recreate your program design on your own computer.

You're now ready to breathe life into your program using professional quality Asymetrix ToolBook® software included in your next project. With its object-oriented technology, this easy-to-use authoring tool has you quickly entering text, graphics, animation, and CD audio – all provided on the exclusive NRI Multimedia Resources CD – to create a content-rich, high-impact multimedia program, one you can use to sell your services to future clients.

What's more, NRI's unique training also includes lessons that show you how to market your services and manage professional projects. By the time you complete your course, you'll have the technical know-how, business savvy, and total confidence to take advantage of today's opportunities in Multimedia.

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Support policies are so-so, with a one-year parts warranty, two years for labor, and tech support available 8 hours per weekday plus 4 hours Saturday. This is not a bad notebook; with better battery life and stronger support it would have rated a Top 20 placing. *Aspen Computer, 800/472-3273, 716/626-0315* **Reader service no. 766**

AST Ascentia 900N

PC WORLD TOP 20
2 POWER MOBILE PC

PROS: Fast, great battery life
CONS: High price, fairly heavy

AST's new Ascentia 900N is poised to ride the crest of the wave of DX4-based portables currently washing over the power mobile market. Clearly a high-class model, this Best Buy features some of the fastest benchmark results we've seen. You expect top performance from a DX4-75—but you don't expect a powerhouse to have a battery life of almost 6¾ hours as well! If that's not enough, the big 10.4-inch active-matrix color screen provides a positively gorgeous display. To match the great screen, AST provides a 32-bit local bus graphics accelerator. Enhancing the unit's display capabilities, a unique panning mode lets you view a 640 by 480 portion of a 1024 by 768 image: You use your cursor keys or mouse to pan across off-screen areas. However, these first-class features, along with a healthy 8MB of RAM and a huge 510MB hard drive, add up to a high $5949 price.

AST Ascentia 900N

At an 8.2-pound traveling weight, this notebook is no featherweight, although it's sturdy and well built. Port covers, sliding doors, and locking devices are all secure. The comfortable keyboard is designed without a palm rest, and you get a responsive TrackPoint-like pointing device. The Ascentia comes preloaded with communications software; to use it you'll need to install a fax-modem. AST's PCMCIA Type III connector can alternatively accommodate two Type II devices.

Service and support policies are exemplary, with a three-year warranty, 24-hour tech support, and a two-day turnaround policy on factory repairs. Sure, you can buy a color notebook for much less. But if you want a truly elegant unit, the Best Buy Ascentia won't leave you pining for more performance, better battery life, or an absolutely top-quality display. That's why it's a Best Buy and a strong number two on the Power Mobile PCs ratings. *AST Research, 800/876-4278, 714/727-4141* **Reader service no. 767**

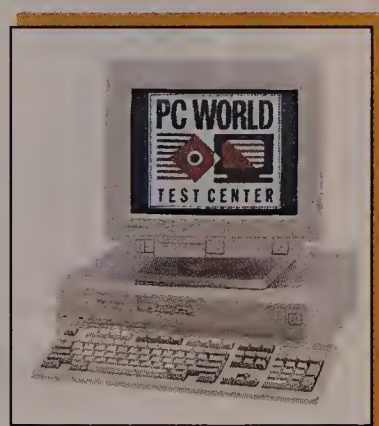
AST Bravo MS 4/66d

PC WORLD TOP 20
13 BUDGET DESKTOP

PROS: Great service and reliability, Plug and Play support
CONS: Hard drive is on the small side

AST's Bravo MS 4/66d is the midrange offering in the company's recently expanded Bravo line of PCs. AST provides a 486DX2-66 CPU, 16MB of RAM (doubled from the Bravo's standard 8MB), 256K of secondary cache, a 1MB 32-bit integrated graphics adapter, and a 15-inch monitor. Performance was noticeably better than what we typically see on a DX2-66. The $2300 price is not too bad, considering the generous RAM configuration—although the 270MB hard drive is none too large.

AST's thoughtful design leaves free and clear access to the SIMM sockets (all four are filled), drive bays, and expansion slots. You get two free externally accessible drive bays and one PCI and two 16-bit slots free, along with a slot you can fill with either a PCI or a 16-bit card. AST provides the BIOS and a utility to make this a Plug and Play system. This new standard is designed to free you from having to find and set available IRQs, the I/O port address, and the DMA channel every time you add an expansion card. The final ingredients needed to make Plug and Play work are compliant expansion cards, configurable via Plug and Play's software components. You'll find more of these devices on the market in months to come. Microsoft's Windows 4.0 (Chicago) operating system also promises to provide the software component of Plug and Play.



AST Bravo MS 4/66d

AST consistently receives high marks in our Reliability and Service Monitor. You get an outstanding three-year warranty, a year of on-site service, and toll-free technical support available 24 hours a day. The excellent support, good performance, and Plug and Play compatibility, combined with the reliable AST pedigree, make this system a solid contender on our Budget Desktops Top 20. *AST Research, 800/876-4278, 714/727-4141* **Reader service no. 768**

AST Premmia MX 4/100t

PC WORLD TOP 20
20 BUDGET DESKTOP

PROS: Excellent service and support, solid design
CONS: Smallish hard drive, so-so DX4-100 performance

DX4-100 systems are really coming into their own—some even best more-expensive Pentium PCs in our tests. This isn't one of the fastest DX4s we've seen, as it falls about 10 percent short of typical DX4-100 desktops in overall performance. But it offers nice design touches for a $2444 budget price, with 8MB of RAM and 256K of secondary cache. The hard disk's on the small side at 270MB, though.

The Premmia is well-made. The expansion slots sit on a sturdy vertical riser, making room to add one PCI and three 16-bit cards and another PCI or 16-bit board. The system has three free drive bays (two externally accessible). The 1MB ATI Graphics Pro Turbo PCI adapter is matched with a 15-inch monitor. You even get an easy-open case.

AST Premmia MX 4/100t

AST's service and support policies are excellent. A three-year warranty, 24-hour toll-free technical support, and one year of free on-site service are about as good as you'll find from any vendor, whether it's top-tier—as AST is—or a smaller seller. *PC World* readers responding to our Reliability and Service Monitor rank the company among the elite in reliability and satisfaction. While this

THE TOP 20

PC WORLD

BUDGET DESKTOPS

1 Diamond DT 486-66
Super-snappy DX2-66 costs just $1650.

➤ New this month ◀ No change from last month
▲ Up from last month ▼ Down from last month

BEST BUYS

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Bus slots
1	◀	Diamond DT 486-66	1	2	87	64	65/66	$1650	486DX2-66	8	270	ISA, VLB
2	➤	Micron 4100PCI Magnum	–	1	87	80	69/82	$2249	DX4-100	8	420	ISA, VLB
3	➤	Gateway P5-60	–	1	86	80	69/72	$2459	Pentium-60	8	540	ISA, PCI
4	▲	MIS M466T	20	9	85	59	78/84	$1920	486DX2-66	8	240	ISA, VLB
5	▼	CompuAdd C466D	2	6	85	56	70/72	$2095	486DX2-66	8	425	ISA, VLB
6	▼	Polywell Poly 486-40DX	3	5	84	51	64/70	$1588	AMD 486DX-40	8	270	ISA, VLB
7	▼	Austin Power System 60	5	3	84	64	68/76	$2258	Pentium-60	8	420	ISA, PCI
8	▲	AST Bravo MT 466d	17	9	84	53	74/72	$1639	486DX2-66	8	170	ISA
9	➤	NEC PowerMate 4100M	–	1	84	75	75/72	$2415	DX4-100	8	420	ISA, VLB
10	▼	Gateway P4D-66	4	5	84	60	69/72	$2295	486DX2-66	8	540	ISA, PCI
11	➤	Polywell Poly 586-66V1	–	1	84	93	64/70	$2460	Pentium-66	8	420	ISA, VLB
12	▲	MIS M466 PCI	43	4	84	46	78/84	$2075	486DX2-66	8	240	ISA, PCI
13	➤	AST Bravo MS 4/66d	–	1	83	61	74/72	$2300	486DX2-66	16	270	ISA, PCI
14	▼	Axik 486DX2-66PCI	13	8	83	57	79/68	$2198	486DX2-66	8	340	ISA, PCI
15	▼	Dell Optiplex 450s/L	7	3	83	52	72/81	$1957	486SX2-50	4	270	ISA
16	◀	Quantex Q486DX2/66MM-4	16	5	83	55	69/77	$2209	486DX2-66	8	540	ISA, VLB
17	▼	ATronics PCI Emerald	6	4	83	59	64/67	$1995	486DX2-66	8	256	ISA, PCI
18	▲	Ares 486-66DX2 EISA/VESA	34	9	83	55	70/69	$1997	486DX2-66	8	340	PCI, VLB [3]
19	▼	Acma 486DX2-66 PCMCIA System	11	6	82	54	73/70	$1876	486DX2-66	8	340	ISA, VLB
20	➤	AST Premmia MX 4/100t	–	1	82	70	74/72	$2444	DX4-100	8	270	ISA, PCI

[1] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to three individual systems' capsule reviews or one capsule plus features table and test reports ($4.95); a complete month's review ($9.95 each; December 3012, January 3001, February 3002, March 3003, May 3005, June 3006, July 3007, August

2 **Micron 4100PCI Magnum**
Fine DX4-100 performer.

3 **Gateway P5-60**
Quick $2459 Pentium-60.

4 **MIS 466T**
Basic DX2-66, good reliability.

5 **CompuAdd C466D**
$2095, DX2-66, 425MB drive.

Monitor size/ dot pitch	Vendor contact number	Issue reviewed	Fax reprint number [1]	Comments
14"/.28	800/989-7253	Sept 94	3138	Very fast DX2-66 at an amazingly low price holds top spot in the budget category.
14"/.28	800/438-3343	Aug 94	3125	Price drop makes this DX4-100 eligible for Best Buy in budget list.
15"/.28	800/846-2000	current	3144	Highest-rated budget Pentium is also close to a Best Buy in power category.
14"/.28	800/733-9188	Dec 93	3052	Great service and reliability give this MIS system a big lift.
15"/.28	800/627-1961	May 94	3103	Well-rounded DX2-66 holds onto a Best Buy slot.
14"/.28	800/999-1278	June 94	3104	Basic AMD-based desktop still a good buy.
15"/.28	800/752-1577	Mar 94	3062	Cheapest Pentium system on Budget Top 20. Overall performance is slow for its CPU class.
15"/.28	800/876-4278	Feb 94	3110	Big price drop rejuvenates basic DX2-66.
15"/.28	800/632-4636	current	3148	Good desktop with quality NEC components.
15"/.28	800/846-2000	June 94	3096	Well-rounded DX2-66 sports large hard drive.
15"/.28	800/999-1278	current	3146	Fastest budget system is also first Pentium-66 to make the list. Also no. 11 on Power Desktops chart.
14"/.28	800/733-9188	July 94	3149	Big boost for MIS service shoots this sluggish DX2-66 into Top 20.
15"/.28	800/876-4278	current	3150	Lots of RAM in this basic DX2-66.
14"/.28	800/234-2945 [2]	Mar 94	3063	No-frills DX2-66 has good reliability.
14"/.28	800/289-3355	Aug 94	3130	One of the first SX2-50s is surprisingly fast. Would do even better with 8MB of RAM.
15"/.28	800/288-0566	June 94	3107	Good value multimedia desktop with big hard drive.
14"/.28	800/488-7776	July 94	3120	Low-cost PCI-based DX2-66.
15"/.28	800/322-3200	Jan 94	3053	Price cut and improved service scores lift this EISA-based DX2-66 into Top 20.
15"/.28	800/786-6888	May 94	3106	Standard desktop with PCMCIA slot, a boon for notebook users.
15"/.28	800/876-4278	current	3151	DX4-100 with PCI in a minimal but flexible configuration.

3008, September 3009, October 3010); and a list of all systems tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone phone required. Charges will appear on your telephone bill.

[2] In California call 408/735-1234.
[3] Also has EISA expansion slots.

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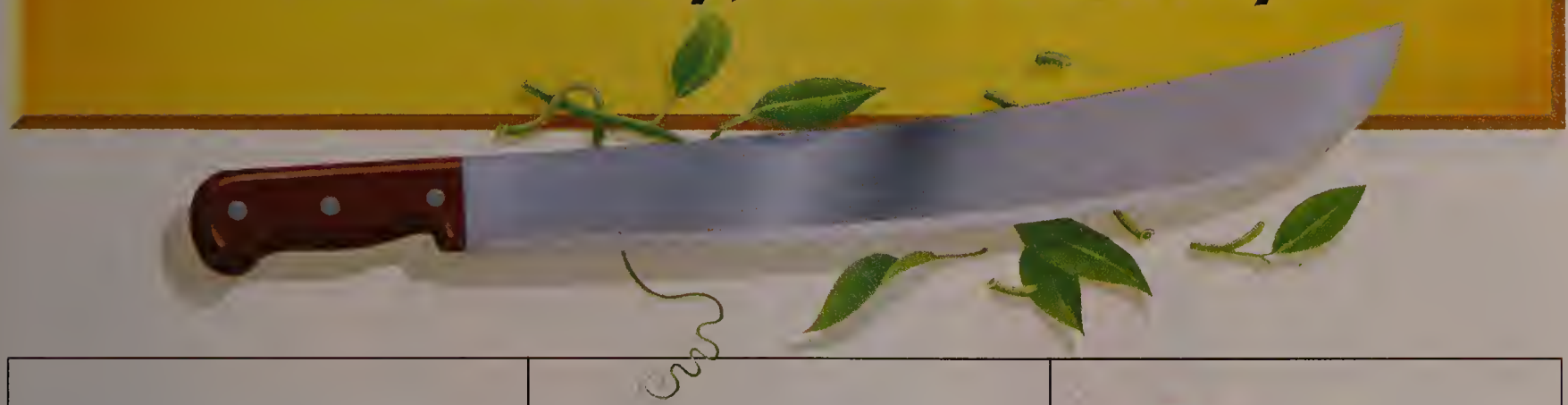

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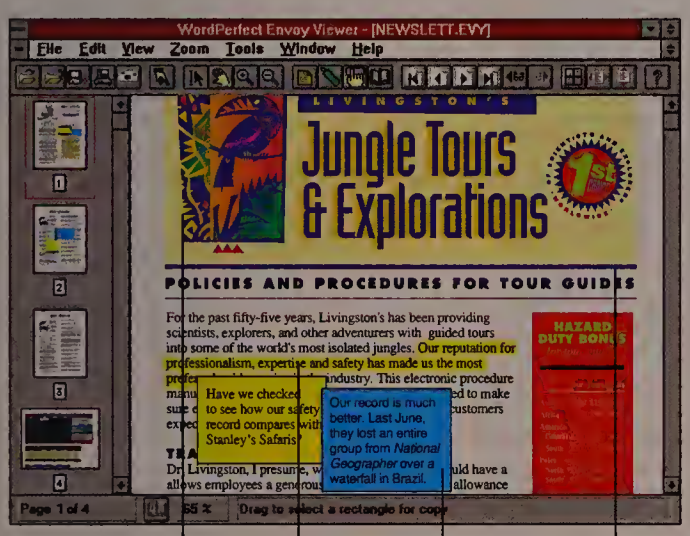

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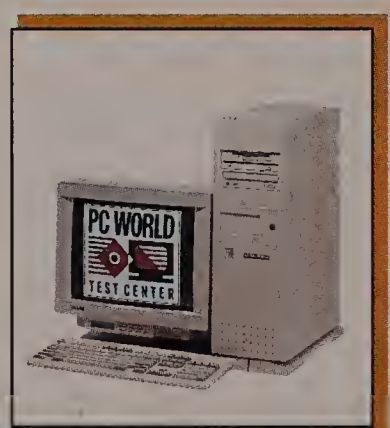
PC's performance is merely good and its hard drive is small, it is still a sound value and a Budget Desktops Top 20 system. *AST Research, 800/876-4278, 714/727-4141* **Reader service no. 769**

Austin P90

PC WORLD TOP 20 7 POWER DESKTOP

PROS: Excellent performance, ample upgrade room, good service and support **CONS:** None

The Austin P90 tower comes with a Pentium-90 CPU, 16MB of RAM (128MB max), and 256K of secondary cache. We expect high performance from any Pentium-90. But this powerhouse raced through our tests an eye's blink behind the fastest PC we've tested. At first glance $4795 may seem steep, but you get a huge 1GB hard drive, an internal Sony CD-ROM drive, a Media Magic sound card, and speakers. Add to that a 64-bit Diamond Stealth PCI graphics card with 2MB of VRAM and a big 17-inch monitor with precision digital controls. The Austin has one PCI and three 16-bit slots free, plus an additional slot you can fill with either a 16-bit or a PCI card. Of the five free drive bays, three are externally accessible.



Austin

Austin's support package includes a two-year warranty and a year of free on-site service, which can be extended for up to two more years for $99 a year. System documentation is adequate, but if you need more help tech support is available around the clock. This ultrafast, powerfully configured, and well-designed system comes with all the right stuff to make a safe landing near the Best Buys in our Power Desktops Top 20. *Austin Direct, 800/752-1577* **Reader service no. 770**

Compaq LTE Elite

PC WORLD TOP 20 1 POWER MOBILE PC

PROS: Superb performance, great screen and battery life, PCMCIA hot-swapping, Plug and Play compatible **CONS:** Inconsistently responsive trackball

The Compaq LTE Elite has everything you expect in a power laptop deluxe—starting with a blockbuster configuration and finishing with a *PC World* number one power mobiles Best Buy. You get a fast DX4-75 CPU, 8MB of RAM (24MB max), a 340MB removable hard drive, and a PCMCIA Type III slot that can alternatively accept a pair of Type I or II devices. The LTE Elite handles PCMCIA cards better than any system we've ever seen, with auto-configuration and hot-swapping. That's right—you can swap PCMCIA cards while your notebook's running and experience nary a glitch. Furthermore, the optional desktop docking station and the entire LTE Elite line of notebooks support the Plug and Play standard.

What about performance? The proof's in the testing, where the LTE Elite completed our application suite about 10 percent faster than a typical DX4-75 notebook. And you won't be at a loss when you have to depend on your battery: It lasted an amazing 6½-plus hours in our run-down tests. This score is all the more remarkable given the system's classy active-matrix color screen. You get bright, rich colors, easily viewable at almost all angles. Our only quibble was with the brightness and contrast controls, which showed a more limited range than we like. And yes, you'll never mistake this $5949 unit for a budget box.

Portability is just fine, with a 7.2-pound traveling weight unimpeded by an external power supply. So what don't we like about this mobile PC? Well, the trackball—built into the viewing side of the screen panel, with buttons opposite the ball on the panel's exterior—is a struggle for left-handers. While most of our right-handed testers liked the arrangement just fine, the pointer sometimes failed to respond to the first roll of the trackball.

Compaq

Compaq's impressive service and support, with its keystone three-year warranty and 24-hour toll-free tech support, is justly famous. Compaq buyers who respond to our monthly service and support poll rate the company among the top vendors in terms of customer satisfaction. Furthermore, the impressive performance, brilliant screen, and superb battery life add up to a power notebook supreme: the number one Best Buy for those who can afford the best. *Compaq Computer, 800/345-1518* **Reader service no. 771**

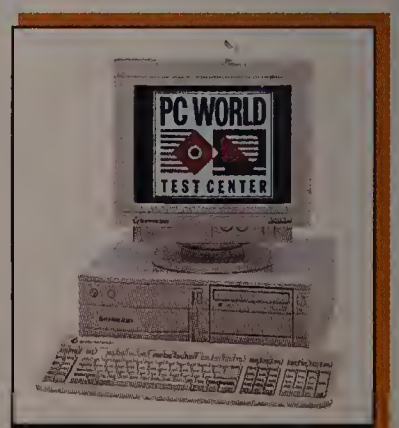
Gateway P5-60

PC WORLD TOP 20 3 BUDGET DESKTOP

9 POWER DESKTOP

PROS: Good performance, roomy hard drive, super software bundle **CONS:** None

Gateway's P5-60 is much more than a garden-variety CD-ROM–ready PC. This number three budget desktops Best Buy Pentium is an outstanding performer, turning in impressive test scores for a 60-MHz machine—closer to what you'd expect from a Pentium-66. And the configuration is beyond solid. In addition to the Sony CD-ROM drive, you get 8MB of RAM, 256K of secondary cache, a spacious 540MB hard drive, a 15-inch monitor driven by an optional 64-bit ATI PCI graphics adapter with 2MB of VRAM, and Microsoft Office Pro preinstalled. The cost? Just $2459. This price-performance combination is so good, the system manages a solid rank on the Power Desktops Top 20 as well. Gateway advertises this system standard with a 1MB 32-bit PCI graphics adapter for $2299, if you don't want to part with the extra bread for the 64-bit card.



Gateway

Expandability is no problem with this compact desktop unit. For example, you can expand RAM to 128MB, and even with the CD-ROM drive installed there are two free externally accessible drive bays. You get one PCI and three 16-bit slots free, along with another slot that will accept either a 16-bit ISA or a PCI card.

The new three-year warranty on desktop products puts Gateway on an even footing with other first-tier companies. In addition, you

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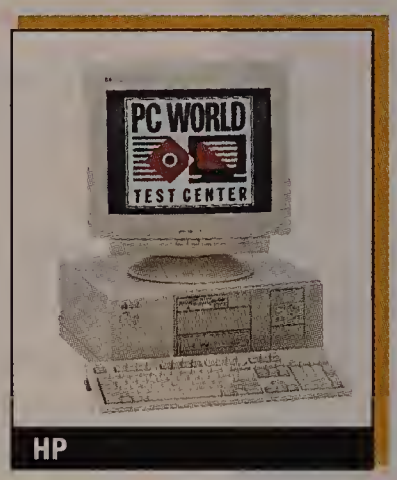
get a year of free on-site service provided by Hewlett-Packard. And Gateway's tech support is available 18 hours per weekday and 5 hours on Saturday. We get droves of comments from readers who own Gateway products. Our Reliability and Service Monitor indicates that Gateway generally handles respondents' problems satisfactorily. It's hard to find anything to criticize in the P5-60: It's an outstanding Best Buy, with exemplary performance, quality components, and an excellent suite of business applications. This PC is likely to enjoy a long run on our Budget and Power Desktops charts. *Gateway 2000, 800/846-2000* **Reader service no. 772**

HP Vectra XU 5/90C PC

PROS: Excellent performance, three-year warranty, quality Toshiba CD-ROM drive, clean design **CONS:** Pricey, only one free drive bay

The HP Vectra XU 5/90C PC is a truly high-class system. This 90-MHz Pentium-based desktop beat out the typical Pentium-90 by a healthy margin, with a particularly speedy Paradox for DOS score. The stellar performance is no surprise given the Vectra's splendid pedigree and fine configuration. You get 16MB of RAM, 256K of secondary cache (512K max), and a 540MB hard drive. The 17-inch monitor is paired with a 2MB Matrox PCI graphics card (upgradable to 4MB) to give you a beautiful 1024 by 768 display. And HP provides a quality Toshiba SCSI CD-ROM drive.

Expandability is good, with the caveat that you have only one drive bay free. You get three free 16-bit slots and another slot for either a PCI or a 16-bit card. The design is neat and accessible: Lift up a foldout metal compartment that houses the power supply, and you'll find the secondary cache, SIMMs, and CPU sockets. Six of the eight SIMM sockets are free.



HP

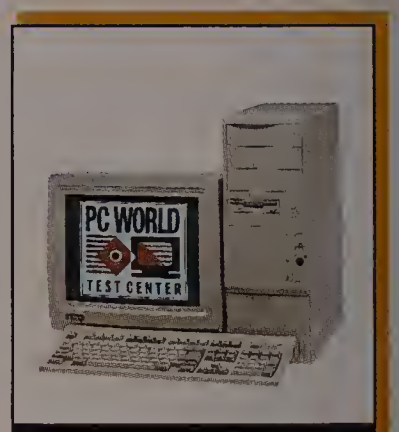
HP gives you a three-year warranty, a year of its highly regarded on-site service, and toll-free round-the-clock tech support. Readers responding to our Reliability and Service Monitor report few technical problems and a reasonable level of satisfaction with HP PCs. There's really nothing to knock in this elegant system. So what makes it fall just short of our Power Desktops Top 20? The $5845 price is stiff. You're paying for the fine design and support—and HP's blue-chip reputation. If those factors don't weigh heavily on your scale, you can find comparable features for less. *Hewlett-Packard, 800/322-4772* **Reader service no. 773**

MidWest Micro Elite P5-60

PROS: Low price, good performance, good expandability
CONS: No on-site service

This month's entry from MidWest Micro, with its successful combination of high performance and low price, is another strong representative of the new breed of budget Pentium systems. You get a Pentium-60 CPU, 8MB of RAM (128MB max), 256K of secondary cache, and a 345MB Maxtor hard drive—not bad for $2299. Performance is comparable to a typical Pentium-60's.

The setup inside the medium-size tower case is clutter free, with excellent accessibility. You get an ample six free drive bays (four externally accessible), plus one PCI and four 16-bit slots free and another slot for either a PCI or a 16-bit card. The 1MB 32-bit PCI graphics accelerator is a decent basic offering, and you get a 15-inch monitor.



MidWest

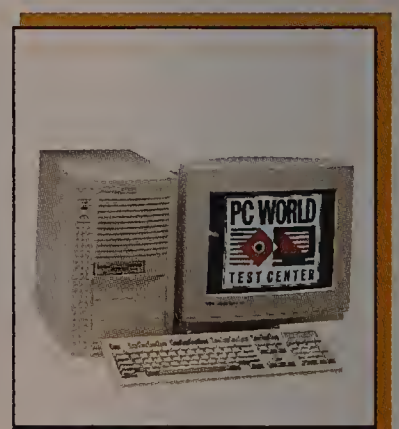
MidWest Micro's support policies are mixed. The company's long three-year warranty is very good. But there are two significant drawbacks: You get no established policy on turnaround times for factory repairs; and instead of providing an on-site service plan, the company ships you replacement parts overnight and you do the repair. To the company's credit, the plain-English documentation is fairly comprehensive. And toll-free tech support is available 10 hours on weekdays and 6 hours on Saturdays. This PC is a good value—but the support deficiencies just edge it from our Budget Desktops Top 20. *MidWest Micro, 800/728-8582* **Reader service no. 774**

NEC PowerMate 4100M

PC WORLD TOP 20
9 BUDGET DESKTOP

PROS: Good performance and expandability
CONS: No-frills configuration for a power system

NEC's $2415 PowerMate 4100M offers excellent DX4-100 performance packaged in a minitower box, although it doesn't have all the feature comforts typical for a power system these days—especially an NEC model. The 8MB of RAM (128MB maximum), 256K of secondary cache, and 420MB hard drive provide a respectable basic configuration. Otherwise you get a fairly spare setup, with no CD-ROM drive and just a 1MB integrated local bus graphics adapter. The company does throw in a solid 15-inch NEC MultiSync 3V monitor (the company's economy model).



NEC

The PowerMate 4100M is a bit quicker than the typical DX4-100. All three externally accessible drive bays are free, and accessibility is good. NEC put the expansion slots on a riser card to free up space inside the case. You get one 32-bit VL bus and four 16-bit slots free; the lowest 16-bit slot will accept only a half-length card because of the close proximity of the CPU fan.

NEC's support policies are excellent, including a three-year warranty backed by a year of free on-site service, 12-hour toll-free tech support, and a fast two-day turnaround policy on service center repairs. And reader feedback leads us to expect no unpleasant surprises from NEC service. All in all, the PowerMate 4100M is a fine business-class PC—although in a relatively no-frills configuration—and it deserves its Budget Desktops Top 20 ranking. *NEC Technologies, 800/632-4636, 508/264-8000* **Reader service no. 775**

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THE TOP 20 PC WORLD MOBILE PCs

1 Compaq LTE Elite
$5949 hot performer has it all.

New this month · Up from last month · No change from last month · Down from last month

		Last month	Months on list	Overall rating	Performance rating	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
POWER SYSTEMS										
1	Compaq LTE Elite	–	1	105	48	83/89	$5949	DX4-75	8	340
2	AST Ascentia 900N	–	1	100	45	66/72	$5949	DX4-75	8	510
3	AT&T Globalyst 200 (486DX2-50)	1	2	98	41	74/83	$3995	486DX2-50	8	250
4	Ambra N75D-340	2	3	95	40	62/69	$3199	DX4-75	8	340
5	Gateway ColorBook DX4-75	3	3	95	41	62/85	$3495	DX4-75	8	250
6	Acer AcerNote 780cx	4	3	94	40	68/81	$3879	DX4-75	8	340
7	Aqualine Hurricane	5	3	93	45	62/66	$5295	486DX2-66	8	540
8	NEC Versa 75EC	6	4	92	42	62/74	$4849	DX4-75	8	340
9	Gateway ColorBook DX2-50	7	4	91	33	62/85	$2995	486DX2-50	8	260
10	TI TravelMate 4000E WinDX4/75	9	5	91	38	69/79	$4949	DX4-75	4	455
BUDGET SYSTEMS										
1	IBM ThinkPad 500	1	2	99	26	75/83	$1699	Cx486SLC2-50	4	170
2	IBM ThinkPad 355	2	3	98	29	75/83	$1999	486SX-33	4	170
3	Compaq Contura Aero 4/33C Model 170	3	4	94	28	83/89	$2395	486SX-33	8	171
4	Toshiba Portégé T3400	4	5	92	29	80/78	$2099	486SX-33	8	120
5	AT&T Globalyst 200 (486SX-33)	7	2	89	23	74/83	$2499	486SX-33	4	170
6	Gateway ColorBook DX2-40	6	2	89	27	62/85	$2699	486DX2-40	8	250
7	Toshiba Satellite T1960CS	–	1	89	31	80/80	$2699	486DX2-50	4	200
8	Dell Latitude 433C-170	–	1	87	23	69/79	$2499	486SX-33	8	170
9	Gateway Handbook DX2-40	8	3	87	27	62/85	$2499	486DX2-40	8	130
10	ZDS Z-Lite 486-25	9	7	87	17	67/80	$1550	486SL-25	4	170

Best Buy

[1] CA = color active, CD = color dual-scan, CP = color passive, MP = mono passive.

[2] Call 900/903-2972 and use the fax reprint numbers to order fax copies of system reviews. You may order an instant fax of up to three individual systems' capsule reviews or one capsule plus features table and test reports ($4.95); a complete

2 **AST Ascentia 900N**
$5949 deluxe model, 510MB hard disk.

1 **IBM ThinkPad 500**
$1699 for peppy mono subnote.

2 **IBM ThinkPad 355**
Fast mono note, great battery life, $1999.

Weight (pounds)	Battery life (hours)	Screen type/size[1]	Vendor contact number	Issue reviewed	Fax reprint number[2]	Comments
7.2	6:32	CA/9.5"	800/345-1518	current	3650	Superb performance, battery life, features. Some units recalled for PCMCIA problem.
8.2	6:44	CA/10.4"	800/876-4278	current	3651	Great performance, nice screen. Solid RAM, mammoth hard drive—a real winner.
7.4	3:33	CA/9.5"	800/637-2600	Sept 94	3647	Fast, reliable, powerful, and looks good. An ideal traveling companion.
8	4:46	CD/10.3"	800/252-6272	Aug 94	3642	Best presenter's notebook with built-in sound, good battery life. The price is right, too.
7.2	4:28	CD/10.3"	800/846-2000	Aug 94	3641	Speedy power notebook with large, quality color screen, good battery life.
8.2	3:20	CA/9.5"	800/848-2237	Aug 94	3643	Reliable all-around power notebook.
9.2	4:03	CA/9.5"	518/272-0421	Aug 94	3644	Fast, loaded with features like built-in sound, huge hard drive.
8.4	3:20	CA/9.5"	800/632-4636	July 94	3636	Ultimate in versatility, completely modular design.
7.2	4:29	CD/9.4"	800/846-2000	July 94	3635	Good balance of performance, battery life, and low cost.
8	3:02	CA/9.5"	800/527-3500	June 94	3625	Slight price drop on this DX4-75 with large hard drive, but it needs more RAM.
6.2	5:40	MP/7.5"	800/426-7735	Sept 94	3648	Top-value subnote blends low price with great functionality.
6.6	5:40	MP/9.5"	800/426-7735	Aug 94	3645	Fast budget notebook with great battery life.
5	6:18	CP/7.8"	800/345-1518	July 94	3637	Top-rated budget color subnote has great battery life and performance.
5.8	6:31	MP/8.5"	800/334-3445	June 94	3627	Fastest mono subnote with amazing battery life.
7.4	4:11	CP/9.5"	800/637-2600	Sept 94	3649	Wonderful design but sluggish. Price drop moves it up list.
7.2	4:50	CD/9.5"	800/846-2000	July 94	3638	Big color screen and good all-around specs.
8.2	3:31	CD/9.5"	800/334-3445	current	3652	Fastest budget notebook would do even better with more RAM; battery life is ordinary.
7.4	5:03	CP/9.5"	800/613-3355	Aug 94	3653	Price drop makes this standard notebook with good battery life eligible for list.
5	5:06	MP/7.8"	800/846-2000	Aug 94	3646	Price includes a fax-modem. No real on-off switch—actually a suspend-resume.
6.2	4:16	MP/8.5"	800/553-0331	Apr 94	3622	Lowest-cost budget subnote is a solid value.

month's review ($9.95 each; April 3004, June 3006, July 3007, August 3008, September 3009, October 3010); and a list of all systems tested by the PC World Test Center for the Top 20s ($4.95). Touch-tone phone required. Charges will appear on your telephone bill.

Polywell Poly 586-66V1

PC WORLD TOP 20
11 POWER DESKTOP
11 BUDGET DESKTOP

PROS: Strong performance, competitive price
CONS: Came with unoptimized memory configuration

Can you make room on your desktop for a compact, budget-priced Pentium-66 with 8MB of RAM (128MB max), a 420MB hard disk, and a CD-ROM drive? If so, meet the Polywell's Poly 586-66V1. We had to do some tweaking to get the high performance we expect from a Pentium-66: Our first benchmark results were a bit disappointing. But after we ran DOS's MemMaker to get the memory-hogging CD-ROM driver out of conventional RAM and into upper memory blocks, this system really showed us what it could do. Optimizing RAM cut the time on our WordPerfect for DOS test in half—an indication that, for Polywell and *all* companies selling units equipped to read CD-ROMs, optimizing memory configurations before shipping is a must. Ultimately, the Poly 586-66V1 ranked very well compared to most 66-MHz Pentiums. While not the main factors, this $2460 system's 1MB 64-bit Actix VLB graphics accelerator and 512K of secondary cache contribute to the fine showing.

Polywell

Don't mistake this for a multimedia PC: You'll have to add your own sound card and speakers if you want to go beyond CD-ROM databases and reference works. The unit provides plenty of expandability: You get two free externally accessible drive bays, and four 16-bit slots and one VLB slot are free. In addition, the system is generally well arranged and tidy inside.

Polywell covers parts for two years and labor for five. The first year of on-site service costs $75. Tech support lines are open during business hours and on Saturdays. This is our first budget Pentium-66, and it shows you don't have to trade high-power performance for a budget price. No wonder this system earns a solid spot on both the Budget and Power Desktops Top 20s. *Polywell Computer, 800/999-1278, 415/583-7222* **Reader service no. 776**

Quantex QP5/90PM-1

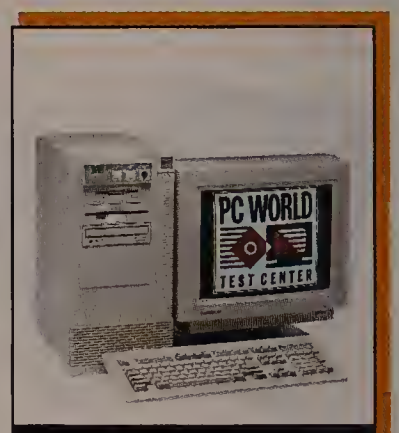
PC WORLD TOP 20
3 POWER DESKTOP

PROS: Ample configuration, good price, good performance
CONS: No weekend support hours

Pinching pennies for a Pentium-90? Quantex's Best Buy QP5/90PM-1 minitower is a super example of how to balance performance and price. It's a bit quicker than the typical system in its class. And Quantex gives you more than you might expect for $3069, starting with a big 17-inch monitor, a 14.4-kbps fax-modem, and communications software. You also get 16MB of RAM (128MB max), a 540MB hard drive, a Sony CD-ROM drive, and both standard floppy drives.

For a minitower, a total of six free drive bays (two externally accessible) is impressive. One PCI and two 16-bit slots are free, along with a slot you can use for either a 16-bit or a PCI board. The two free SIMM sockets are easy to get at, but the two installed SIMMs are cramped by the drive cage. The 32-bit PCI graphics subsystem is fine for business apps, and you get a 17-inch GoldStar monitor.

Quantex's support policies are solid fare: a one-year warranty backed by on-site service and 11-hour toll-free tech support on weekdays. Supportive feedback on our Reliability and Service Monitor ensures a good service rating. With a healthy configuration and good performance, this minitower earns a number three Best Buy rating on our Power Desktops Top 20. *Quantex Microsystems, 800/288-0566, 908/563-4166* **Reader service no. 777**



Quantex

Toshiba Satellite T1960CS

PC WORLD TOP 20
7 BUDGET MOBILE PC

PROS: Good price and performance
CONS: Insecure trackball attachment, 200MB hard drive is largest available

Looking for a powerful, bargain-priced color notebook? Toshiba's $2699 Satellite T1960CS is just that. Equipped with a 486DX2-50 processor and a basic 4MB of RAM, this hefty 8.2-pound unit provides solid mobile DX2-50 performance. Its 9.5-inch dual-scan passive color screen offers a fair compromise between low price and good quality.

The Satellite's relatively flat keys are well laid out; key travel is short—which takes getting used to if you like a fuller motion. The large trackball clips onto the unit's right-hand side but falls off easily if you bump it. The PCMCIA Type III slot accepts a single Type I, II, or III card. Unfortunately, the 200MB hard drive isn't removable, and it's the top option.

Toshiba

The Satellite T1960CS's battery life is a respectable 3½ hours. If you want to get on-site service while the Satellite's one-year warranty is active, you pay a reasonable $50. Tech support is available 24 hours a day. Overall, the Satellite T1960CS is a strong value, offering low-cost color without compromising performance. *Toshiba America Information Systems, 800/334-3445, 714/583-3000* **Reader service no. 778**

ZDS Z-Star 433VLp

PROS: Low price, strong support policies
CONS: Slow performance, 12MB RAM limit, awkward pointing device

Zenith Data Systems' Z-Star 433VLp notebook has the basics of a good Windows travel companion: 4MB of RAM, a 200MB hard drive, and a PCMCIA Type II slot. The $1795 price is tempting, but the Cyrix 486SLC-33 CPU and conservative 4MB of RAM (upgradable to just 12MB) mean you'll get mediocre performance—even compared to a typical Intel 486SX-25 notebook's.

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Circle 107 on reader service card

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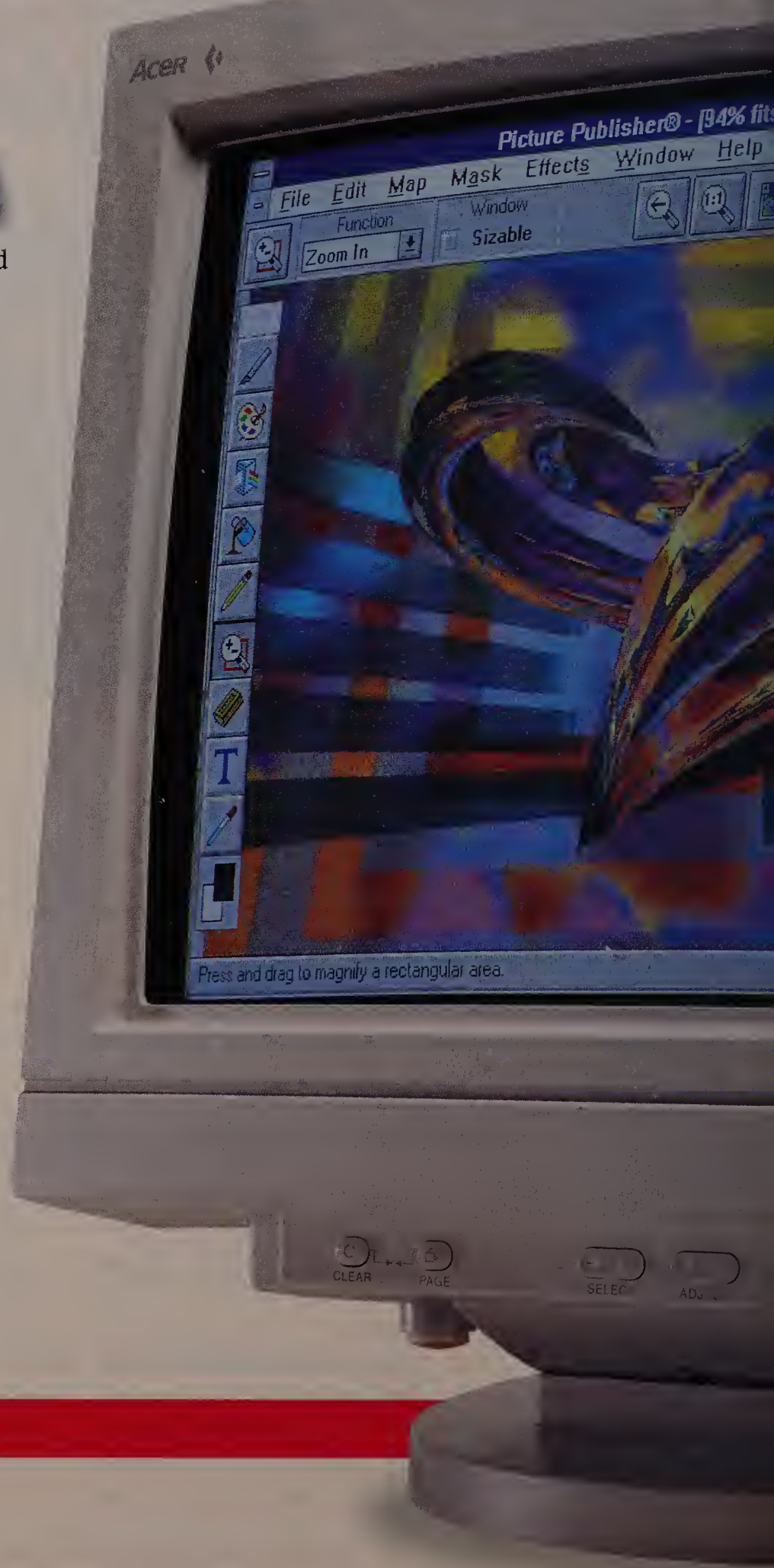

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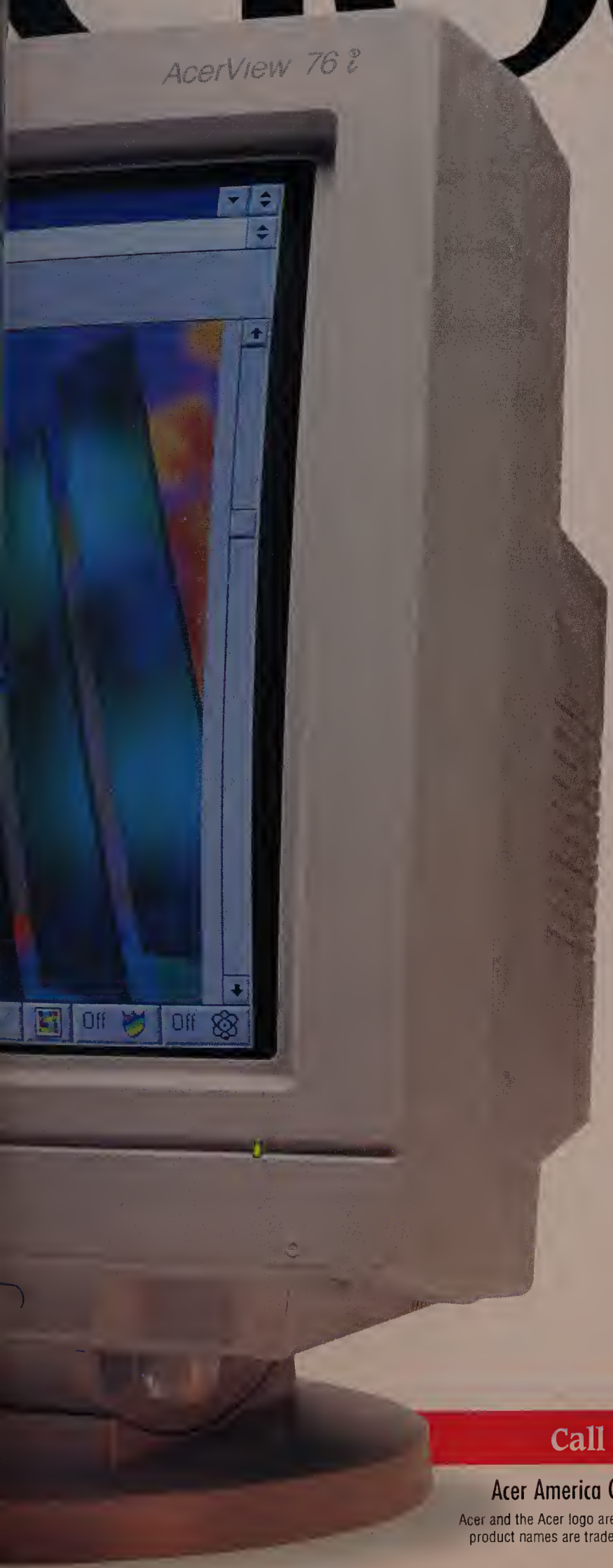

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Circle 102 on reader service card

FEATURES COMPARISON: THIS MONTH'S CONTENDERS—DESKTOPS

Faster CPUs, More RAM, Storage Mean Greater Desktop Value

● Yes
○ No
n/a = not applicable

	AcerAcros 486DX2/66	ALR Evolution V ST/90	Ambra D4100BL	Ambra MediaPro 90	Ares PCI/VESA	AST Bravo MS 4/66d	AST Premmia MX 4/100t	Austin P90	BEST BUY Gateway P5-60	HP Vectra XU 5/90C PC
Standard features										
Selling price as of 7/8/94[1]	$2099	$3996	$2499	$3899	$2195	$2300	$2444	$4795	$2459	$5845
CPU	486DX2-66	Pentium-90	IBM486BL-100[2]	Pentium-90	486DX2-66	486DX2-66	DX4-100	Pentium-90	Pentium-60	Pentium-90
CPU or upgrade socket	238-pin ZIF	296-pin ZIF	238-pin ZIF	296-pin ZIF	169-pin ZIF	238-pin ZIF	238-pin ZIF	296-pin ZIF	273-pin ZIF	296-pin ZIF
BIOS	Acer 7/1/91	Phoenix 5/25/94	IBM Surepath 2/24/94	AMI 6/16/94	Phoenix 4/19/90	AST 1.00.27	AST 1.01.01	AMI 4/23/94	AMI 1/24/94	Phoenix 5/13/94
Installed/maximum RAM (MB)	8/36	16/264	16/64	16/128	8/128	16/128	8/128	16/128	8/128	16/256
30-pin or 72-pin SIMMs	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin	72-pin
SIMM sockets/number free	2/1	4/2	4/0	4/2	4/2	4/0	4/2	4/2	4/2	8/6
Secondary RAM cache installed/ maximum (K)	256/256	256/256	256/256	256/256	256/512	256/256	256/256	256/256	256/256	256/512
Case style	compact	tower	compact	minitower	tower	desktop	compact	tower	compact	compact
Free externally accessible 3½-inch/ 5¼-inch drive bays	0/1	0/3	0/1	0/2	0/2	0/2	0/2	2/1	0/2	0/1
Free internal 3½-inch/5¼-inch drive bays	0/0	1/0	1/0	2/0	0/1	0/0	1/0	1/1	0/0	0/0
Free 32-bit EISA/16-bit ISA/8-bit ISA expansion slots[3]	0/2/0	0/5/0	0/3/0	0/4/0	0/1/0	0/3/0	0/4/0	0/4/0	0/4/0	0/4/0
PCI or VL bus slots/number free[3]	0/0	3 PCI/2	3 VLB/1	3 PCI/2	4 PCI/3, 2 VLB/1	2 PCI/2	3 PCI/2	3 PCI/2	3 PCI/2	2 PCI/1
Hard disk	Conner CF5420A	Conner CFA540A	WD Caviar 2700	WD Caviar 2700	WD Caviar 2420	Quantum LPS 270 AT	Quantum LPS 270 AT	Micropolis 4110A	WD Caviar AC 2540H	HP Quantum LPS 540
Size (MB)	420	540	700	700	420	270	270	1065	540	540
Adapter	integrated	integrated	integrated	integrated	DTC 2278VL	integrated	integrated	integrated	integrated	integrated
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44	1.44	combo	1.44	1.44
Graphics adapter	integrated VLB	ATI Mach 64 64-bit PCI	integrated local bus CL-GD5428	Ambra TrueVideo 32-bit PCI	Genoa Phantom 32i 8900VL	integrated local bus CL-GD5428	ATI Graphics Pro Turbo PCI	Diamond Stealth 64 64-bit PCI	ATI GX Mach 64 64-bit PCI	Matrox MGA PCI
Installed VRAM/DRAM (MB)	0/1	2/0	0/2	0/2	0/2	0/1	0/1	2/0	2/0	0/2
Monitor	Acer 7134T	ALR ClearView 15	Ambra FST-MPR II	Ambra BMS 4000	CTX 1562 GM	AST ASTvision 5L	AST ASTvision 5L	Austin CA-1719	CrystalScan 1572 DG	HP D2807 A
Screen diagonal (inches)/ dot pitch (mm)	14/.28	15/.28	15/.28	17/.28	15/.28	15/.28	15/.28	17/.28	15/.28	17/.28
Modem speed for data/fax (kbps)	2.4/9.6[4]	n/a	n/a	n/a	2.4/9.6[4]	n/a	n/a	n/a	n/a	n/a
Sound board	Creative Labs SoundBlaster	○	Media Vision Pro Audio 16	Media Vision Pro Audio 16	Audioblitz A3300	○	○	Media Magic SP16	○	○
CD-ROM drive	OEM CR-563-B	○	LMSI CM-206	LMSI CM-206	Mitsumi CRMC-FX001D	○	○	Sony CDU33A	Sony CDU33A	Toshiba XM-4101 B
Data transfer rate (K/sec)	300	n/a	352	352	300	n/a	n/a	300	300	300
Parallel/serial/mouse/SCSI ports	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0	1/2/1/0	1/2/0/0	1/2/1/0	1/1/1/1
Service and support										
Warranty (years)	1	5/1.25[5]	1	1	3[6]	3	3	2	3	3
30-day money-back guarantee	●	●	●	●	●[8]	○	○	●	●	○
On-site service first-year price	free	$9.95	$29	$29	free	free	free	free	free	free
Service center turnaround (days)	3	3	7	7	○	○	○	2	○	3
Daily toll-free phone support (hours)	24	12	24	24	24	24	24	24	18	24
Weekend support	●	●[10]	●	●	●	●	●	●	●[10]	●
BBS	●	●	●	●	●	●	●	●	●	●
Fax	●	●	●	●	●	●	●	●	●	●

[1] All systems priced as configured with DOS 6.0 or later version, Windows 3.1, VGA and color monitor, keyboard, and mouse or other pointing device. Selling price is direct or based on vendor estimate.

[2] Cyrix Cx83D87-33-GP math coprocessor also installed.

[3] One less 16-bit ISA slot available when all PCI slots are filled and vice versa; VL slots accept 8- or 16-bit ISA cards.

[4] Sends fax at 9.6; receives fax at 4.8.

[5] System five years, most peripherals 15 months (hard drive three years).

	MidWest Micro Elite P5-60	NEC PowerMate 410DM	Polywell Poly 586-66V1	Quantex QP5/90PM-1 (BEST BUY)	Zeos Pantera DX4-100 (BEST BUY)
	$2299	$2415	$2460	$3069	$2990
	Pentium-60	DX4-100	Pentium-66	Pentium-90	DX4-100
	273-pin ZIF	238-pin ZIF	273-pin	296-pin ZIF	238-pin ZIF
	AMI 4/15/94	Phoenix 6/6/94 4.03.4	AMI 11/11/92	AMI 4/23/94	Phoenix 5/23/94 4.03 MSD
	8/128	8/128	8/128	16/128	16/128
	72-pin	72-pin	72-pin	72-pin	72-pin
	4/2	4/2	4/2	4/2	4/0
	256/256	256/256	512/512	256/256	256/256
	tower	minitower	compact	minitower	compact
	1/3	0/3	0/2	0/2	1/1
	2/0	0/0	0/0	4/0	0/1
	0/5/0	0/4/0	0/4/0	0/3/0	0/4/0
	3 PCI/2	1 VLB/1	3 VLB/1	3 PCI/2	3 PCI/2
	Maxtor 7345AT	WD Caviar 2420	WD Caviar 2420	WD Caviar 2540	Seagate ST5660A
	345	420	420	540	530
	integrated	integrated	Poly DC-420	integrated	integrated
	1.44	1.44	1.44	1.2, 1.44	1.44
	OEM Tseng ET4000 PCI	integrated local bus	Actix Graphics 64-bit VLB	WD Paradise PCI Plus	Diamond Stealth 64 64-bit PCI
	0/1	0/1	1/0	0/2	2/0
	MidWest Micro Hyper VGA III	NEC MultiSync 3V	Sampo Alphascan 15	Goldstar 1720V	CTX CMS 1561/LR
	15/.28	15/.28	15/.28	17/.26	15/.28
	n/a	n/a	n/a	14.4/14.4	n/a
	○	○	○	○	○
	○	○	OEM CR-328A/ 8000AT	Sony CDU33A	Mitsumi CRMC-FX001D
	n/a	n/a	300	300	300
	1/2/0/0	1/2/1/0	1/2/0/0	1/2/0/0	1/2/0/0
	3	3	2/5[7]	1	1
	●	●	●[9]	●	●
	○	free	$75	free	$49
	○	2	3	1	2
	10	12	9	11	24
	●[10]	○	●[10]	○	●
	●	●	●	○	●
	●	●	●	●	●

[6] Free labor for life of system.
[7] Two years parts, five years labor.
[8] 60 days.
[9] Conditional restocking fee.
[10] Saturdays only.

At a 7.9-pound traveling weight, this unit is not petite, but like most ZDS notebooks it's well designed and well put together. The Z-Star's 9.5-inch dual-scan passive color display is surprisingly vivid and evenly lit, with easy-to-use controls above the keyboard. Even the keyboard feels roomy, although ZDS's space-saving "J-Mouse" pointing device takes time to master.

ZDS

The 3-hour battery life is respectable, and you can hot-swap in a spare without shutting down completely. You get a one-year warranty and toll-free support 15 hours per weekday. This unit doesn't make it onto the budget side of our Mobile PCs Top 20, but it's a good basic bargain—as long as you can accept the performance-for-price trade-off. *Zenith Data Systems, 800/553-0331, 708/808-5000* **Reader service no. 779**

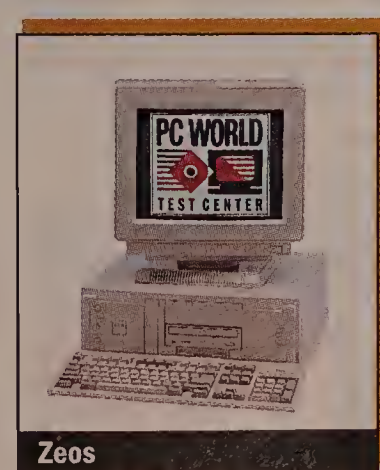
Zeos Pantera DX4-100

PC WORLD TOP 20 — 2 POWER DESKTOP

PROS: Excellent performance, reasonable price
CONS: Limited number of full-length slots

We should be used to seeing Zeos machines exceed performance expectations by now. This DX4-100 system is set up in a rock-solid power configuration, featuring 16MB of RAM, a 256K secondary cache, and a 530MB hard drive. Furthermore, Zeos throws in a Mitsumi CD-ROM drive, a Diamond Stealth 64 PCI graphics card, and a 15-inch CTX CMS monitor. The Pantera DX4-100's $2990 price is going to attract buyers who don't want to spend big but want more than they can typically get within our $2500 budget limit.

The Pantera's overall performance surpassed its peers' showings in our tests, with a 20 percent lead over the typical DX4-100. The system actually compares well with many quick 90-MHz Pentiums. Its great showing is founded on our disk-intensive Paradox tests, where it ran about 40 percent quicker than typical DX4-100s. A clue to the fine disk-intensive performance may be found in Zeos's IDE-to-PCI interface, which—according to Zeos—takes advantage of the high-speed PCI bus and the large 256K buffer on the 530MB Seagate hard drive.



Zeos

This compact has one PCI slot and three 16-bit slots free and a shared slot for either a PCI or a 16-bit card. Depending on the card, you can fit in only one to two full-length boards, however. You get three free drive bays (two externally accessible). The one-year warranty, with a $49 option for a year of on-site service, isn't exceptional, although tech support is available 24 hours a day. This system is so fast and well configured, it's an easy power desktops Best Buy, and it came within a whisker of rating number one. *Zeos International, 800/554-5220, 612/633-4591* **Reader service no. 780**

System Snapshots

These systems present unique and valuable solutions to end-user needs, but they rate lower as business PCs than the preceding group.

AT&T Globalyst 550

PROS: Strong performance, three-year warranty
CONS: High price, limited expandability

AT&T's Globalyst 550 is a pricey $4003 compact DX4-100 powerhouse with 16MB of RAM, 256K of secondary cache, a 530MB hard drive—and very nice performance comparable to what you'd get from many quick Pentium-66s. The system provides an integrated 2MB PCI graphics accelerator and comes with a good 15-inch monitor. This system gives you space to add one PCI and three 16-bit cards, along with an additional slot that accepts a 16-bit or a PCI card. Only one dedicated 16-bit slot will take a full-length board, however, and there's just one free drive bay (externally accessible).

AT&T offers great service and support policies, including a three-year warranty with a year of free on-site service and 24-hour tech support. AT&T even offers a 30-day money-back guarantee, and that's unusual for a company selling primarily through dealers. Like many of the better systems now appearing in this section, this fast PC is a solid value with quite a lot to offer—even if it's not priced for bargain hunters. *AT&T, 800/637-2600, 513/445-5000* **Reader service no. 781**

Canon Innova Book 10

PROS: Low price, compact, light
CONS: Very short battery life, slow

This $1849 486DX-33 mono subnote has tiny dimensions and a 7-pound traveling weight (with power supply and external floppy drive). Unfortunately, it lacks staying power away from an AC outlet—it gave up the ghost after less than 2 hours in our tests. Performance also lags behind that of the typical 486DX-33 mobile PC—especially in Windows applications.

You get 4MB of RAM (20MB max) and a 170MB removable hard disk. The screen offers a wide range of brightness and contrast. But the on-screen pointer is intermittently unresponsive to the trackball. Though the keyboard is well laid out, its keys rattle and wobble in a manner that disconcerted our testers. Service and support includes a one-year warranty, 24-hour roadside replacement, toll-free tech support 15 hours weekdays and 7 hours on Saturday, and a one-day turnaround policy. This is a decent little system, but its slow performance and poor battery life keep it off our shortlist. *Canon Computer Systems, 800/848-4123* **Reader service no. 782**

Canon NoteJet 486C

PROS: Built-in ink jet printer
CONS: Poor performance, awkward pointing device, 12MB RAM limit

Today, mobile computers *almost* make you forget you're working outside the office—until you need a printout. The hefty 10.8-pound Canon NoteJet 486C ($2699 with 4MB of RAM and a 200MB hard drive) solves the printing problem by integrating a color notebook and a 360-dpi ink jet printer. Unfortunately, the 486SX-33 NoteJet is a poor performer. Display quality on the 9.5-inch screen is reasonably good for passive color, however, and battery life is a decent 3¼ hours. (Our standard notebook battery-life tests don't include printing.) The NoteJet 486C has a PCMCIA Type III slot, which can alternatively accept two PCMCIA Type II cards.

Canon's one-year warranty features 24-hour roadside replacement and a one-day turnaround policy on factory repairs. Tech support is open 15 hours on weekdays and 7 on Saturdays. On the whole, we think the NoteJet II 486C (reviewed below) is a much better value. *Canon Computer Systems, 800/848-4123* **Reader service no. 784**

If you can live with the Canon NoteJet II 486C's basic performance, it can provide a viable antidote for the no-printout road-warrior blues.

Canon NoteJet II 486C

PROS: Built-in ink jet printer, large screen
CONS: Rattle occurs while typing, 12MB RAM limit

Like its NoteJet 486C sibling, this lighter 9.8-pound unit is designed for business travelers needing printouts on the road. Configured with an IBMSLC2-50, 4MB of RAM, a 260MB removable hard disk, and a PCMCIA Type III slot, the $3099 Canon NoteJet II 486C is as fast as a typical 486SX-33 notebook and has a socket for a math coprocessor for users whose apps need one. You get a big, bright 10.3-inch passive color screen. Canon's design emulates the IBM ThinkPad's keyboard and TrackPoint pointing device—a particularly effective design—but when typing we noticed an annoying internal rattle.

Battery life is a very good 4⅔ hours. (We didn't test the battery life while using the printer, however). Support is the same as for the other Canon products reviewed. Let's face it, this little unit just can't run with the DX2s and DX4s, but if you can live with basic performance, it can provide a viable antidote for the no-printout road-warrior blues. *Canon Computer Systems, 800/848-4123* **Reader service no. 783**

Compaq Deskpro XL 560

PROS: Nice sound setup, integrated ethernet and SCSI adapters, great service and support
CONS: Very pricey for a Pentium-60

The Deskpro XL 560 comes with an unusual keyboard that provides an integrated speaker and microphone—it's likely to be the first thing about this machine that catches your eye. The system provides a Pentium-60 CPU and has PCI and EISA expansion buses, a 15-inch monitor, and a 2MB 32-bit Matrox MGA PCI graphics adapter. But $3798 is a lot to pay for a pedestrian 8MB of RAM and a 270MB hard drive—especially when other top-tier manufacturers are offering Pentium-90 PCs with generous RAM and hard disk configurations for less. You get three free drive bays (two externally accessible), as well as three free EISA slots and another that can be used for an EISA, ISA, or PCI card. Compaq also provides integrated PCI ethernet and SCSI-2 adapters.

Compaq's service and quality can only be described in superlatives. But even the three-year warranty, the year of free on-site service, and around-the-clock phone sup-

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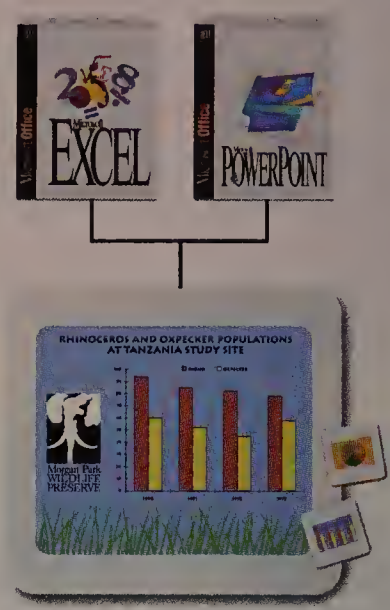
Wouldn't it be great if there were a product that could help you pull it all together?



Create powerful presentations easily with information from different programs. Suddenly, you're a whiz presenter.

In a nutshell, that's the whole idea behind the Microsoft® Office. Now all your programs can work together like one.

Thanks to our intuitive OfficeLinks tools, it's easier than ever to share text, data and graphics seamlessly between our best-selling programs.

What's this really mean?

Simply, you'll be able to get more done. With a lot less effort.

Say you're working on your sales report. You'll probably start by writing in Microsoft Word.

*Support for Microsoft Office is no-charge; however, normal telephone company char
Microsoft Excel, Word, the PowerPoint presentation graphics program, the Microso
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Then you click to open your Microsoft Access® database and call up your sales data. By client. By vendor. By salesperson. By region. By month.

But why stop there?

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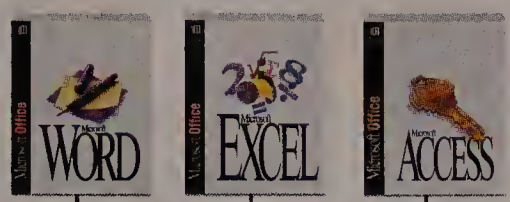
It's like one big technological swap fest. The end benefit being, that now you can spend more time concentrating on your work, instead of on your software.

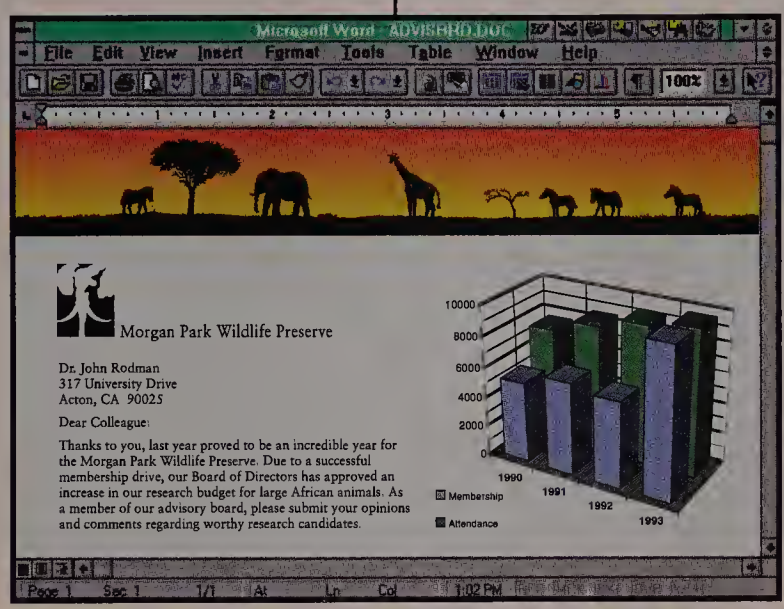
Naturally, you'll want to share your handiwork with the regional managers.

Just a couple of clicks later, you've created personalized letters for each one of them from within Microsoft Word.

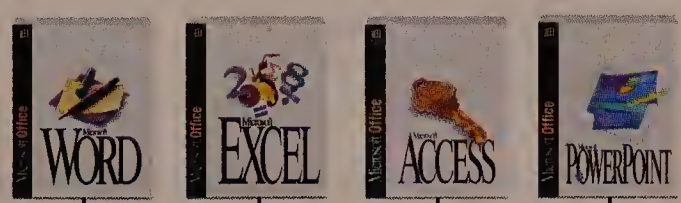
Brilliant.

Now for the finishing touch. Click a button and transform everything into an eye-popping PowerPoint® presentation. Call it a "career-enhancing" move.





It's easy to update or manage text, data and graphics in one document with the latest object linking and embedding technology (OLE 2.0). Just click where you need to work and the tools you need are right there.



And while we're on the subject of relationships, we should mention the Microsoft Office is the only product of its kind that offers you unlimited product support with no service charge.*

Clearly, the Microsoft Office with OfficeLinks marks a quantum shift in what software enables you to achieve. And it's a clear indication of where the future is heading.

To find out the rest of the story (a small sample of which we've covered here), visit your retailer or call (800) 240-4782, Department NVD, for your Office Information Kit.

With the Microsoft Office, you'll not only improve the relationship between your programs, the same will go for you and your computer.

Microsoft Office

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FEATURES COMPARISON: THIS MONTH'S CONTENDERS—MOBILE PCs

DX4-100 Power Notebook Joins Dominant DX4-75s

● Yes
○ No
n/a = not applicable

	Aspen Universa Series E	AST Ascentia 900N	BEST BUY Compaq LTE Elite	Toshiba Satellite T1960CS	ZDS Z-Star 433VLp
Standard features					
Selling price as of 7/8/94[1]	$3495	$5949	$5949	$2699	$1795
CPU	DX4-100	DX4-75	DX4-75	486DX2-50	486SLC-33
Traveling weight (pounds)[2]	8.6	8.2	7.2	8.2	7.9
Width x depth x height (inches)	11 x 8.6 x 2.1	11.5 x 8.5 x 2	11.8 x 8.9 x 2	11.6 x 8.5 x 2	11 x 8.5 x 2.1
Installed/maximum RAM (MB)	8/36	8/24	8/24	4/20	4/12
Secondary RAM cache installed/maximum (K)	128/128	0/0	0/0	0/0	0/0
Installed/maximum hard disk (MB)	340/520	510/510	340/340	200/200	200/200
Removable hard disk	●	●	●	○	○
Display type	color dual-scan	color active	color active	color dual-scan	color dual-scan
Screen diagonal (inches)	9.6	10.4	9.5	9.5	9.5
Maximum colors or gray shades of LCD	256	256	256	256	256
Simultaneous LCD and external monitor	●	●	●	●[3]	○
Highest resolution of external monitor	1280 x 1024	1024 x 768	1024 x 768	640 x 480	640 x 480
Mouse/keyboard ports	0/1	1/0[4]	1/0[4]	1/1	1/0
Cursor keys in inverted T	●	●	●	●	●
Dedicated page-control keys	●	●	●	●	●
All 12 function keys dedicated	●	●	●	●	●
Standard <Ctrl> and <Alt> layout	○	○	●	○	○
Built-in pointing device	●	●	●	○	●
Modem speed for fax/data (kilobits per second)	n/a	n/a	n/a	n/a	n/a
Docking station available	●	●	●	○	○
PCMCIA slot Type II/III	0/1[5]	0/1[5]	0/1[5]	0/1	1/0
Power management					
Supports APM	○	●	○	●	●
Type of battery	NiMH	NiMH	NiMH	NiMH	NiMH
Suspend button	○	●[6]	○[7]	○	○[7]
Suspends when case closed	○	●	○[7]	○	○[7]
Service and support					
Warranty (years)	1/2[8]	3	3	1	1
30-day money-back guarantee	●[9]	○	●	○	●
On-site/replacement service price for first year	○	○	free	$50	free
Tumaround policy (days at service center)	1	2	2	2	2
Daily toll-free phone support (hours)	8	24	24	24	15
Weekend support	●[10]	●	●	●	○
BBS	○	●	●	●	●
Fax	●	●	●	○	●

[1] All notebooks priced as configured with DOS 6.0 or later version, Windows 3.1, VGA monochrome or better display, and mouse or other pointing device. Selling price is direct or based on vendor estimate.
[2] Includes computer, adapter, power cord, and external floppy drive if notebook has one.
[3] LCD becomes monochrome.
[4] Mouse port doubles as keyboard port.
[5] Type III slot alternatively holds two Type II devices.
[6] Suspends with key combination.
[7] Standby only.
[8] One year parts, two years labor.
[9] Restocking fee of 15 percent.
[10] Saturdays only.

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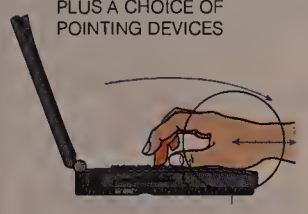

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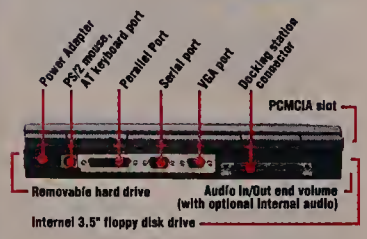

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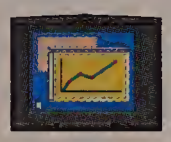

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The 75MHz WinBook XP

The only feature we forgot was the high price tag.

August 1994
WinBook XP DX2/50
4/260 Monochrome

Full of features and plans for a big future—the 75MHz WinBook® *XP* brings you up to a new height in performance and value. The 32-bit local bus video Rocketchip accelerator boosts your graphics performance level and a ten-cell NiMH 2500mA battery pack lets you run power-hungry programs longer. Plus an LCD indicator lets you monitor functions at a glance. You get the same unique ergonomic features that critics raved about with the original WinBook—full size keys, a sloping wrist rest, and now your choice between the standard pointing stick or an optional 19mm dual-button trackball.

WinBook *XP* components are upgradable with user-upgradable RAM to 32MB, upgradable screen, removable hard drives to 520MB capacity and PCMCIA capabilities. Options include a 14.4 fax/voice/data modem, internal audio and docking station.

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Circle 197 on reader service card

port don't make up for the system's high cost. *Compaq Computer, 800/345-1518* **Reader service no. 785**

Compaq ProLinea 4/33S

PROS: Excellent support, nice multimedia setup
CONS: Limited expandability, 33-MHz performance

The ProLinea 4/33S is a basic entry-level multimedia PC with super service and reliability, and its $2271 price fits nicely under our budget limit. But this system—which is faster than you'd expect a 33-MHz 486SX with an unfilled secondary cache to be—is still a 33-MHz machine in a world where similarly priced DX2-66s hold the budget high ground. The 8MB of RAM is decent. However, the 200MB hard drive is just barely adequate.

You get a 15-inch Compaq monitor plus an integrated 1MB VLB graphics adapter, but you can't upgrade the video memory. Furthermore, no VLB slots are free. To make matters worse, all three drive bays are occupied. You do get Compaq's nice SCSI CD-ROM drive and great service: a three-year warranty, a two-day turnaround policy, and around-the-clock phone support. But we suspect only some home buyers will go for this unit. *Compaq Computer, 800/345-1518* **Reader service no. 786**

Compaq ProLinea 4/50

PROS: Great support, thorough documentation
CONS: No upgrade path via local bus

The mere fact that the ProLinea 4/50 is a Compaq carries clout, implying good design and construction, quality components, and great service and support. For an estimated street price of $2320, Compaq delivers an entry-level desktop system, featuring a 486DX2-50 CPU, 8MB of RAM, and a 340MB hard drive. This is your basic desktop machine—and that's all. Users who hope to add components over time will be frustrated by the lack of expandability.

Its performance is better than that of the typical DX2-50 machine, although not up to the standards of DX2-66s, which have practically taken over the rankings at this price point. There's only one free drive bay (externally accessible). Three free ISA slots leave room to add 16-bit cards, but without any local bus slots your upgrade path is rocky. The ProLinea doesn't compare well to the fast, loaded machines we're seeing for this price. Many other vendors offer more—although without the comforting Compaq label. Bottom line: This unit just won't fit the bill for most budget business buyers. *Compaq Computer, 800/345-1518* **Reader service no. 787**

Compaq ProLinea 4/50S

PROS: Great service, support, and documentation
CONS: No local bus upgrade path, SIMM sockets obstructed by hard drive

This system is a near-twin of the Compaq ProLinea 4/50. Only the processors have been changed. The clock-doubled 50-MHz 486SX2 in this unit produces nearly the same performance as the DX2-50 in its sibling. This $2258 unit saves you about $60, but if you use an application, such as CAD, that's heavily dependent on a math coprocessor, you'll need the DX2 version's integrated coprocessor. You get the same great design, documentation, and service and support as with the DX2-50. You're also stuck with the same lack of expandability. Considering the strength of the competition at this level, if you're not a Compaq-only buyer you won't even think about breaking your piggy bank for this system. *Compaq Computer, 800/345-1518* **Reader service no. 788**

CompuAdd 450 Colorpro

PROS: 340MB hard drive, built-in sound
CONS: So-so performance, short battery life

CompuAdd is a company with a very solid reputation, and the $3995 450 Colorpro notebook is a reasonably good notebook with a 9.5-inch active-matrix color screen, business audio, speaker, and two PCMCIA Type II slots. Unfortunately it lags in performance, matching up better with a typical DX-33 notebook than with its DX2-50 peers. CompuAdd provides just 4MB of RAM but gives you a roomy 340MB hard drive. Battery life is a disappointment—just 2¼ hours with typical power management features enabled.

CompuAdd's one-year warranty comes with a 30-day money-back guarantee and long weekday support, but no weekend hours. The 450 Colorpro is a good color notebook, but its short battery life makes it more at home on a hotel or conference room desktop than on a seat-back tray. *CompuAdd, 800/627-1961, 512/250-1489* **Reader service no. 789**

DTK Feat-35

PROS: Two-year warranty
CONS: Slow performance, minimal configuration, sharp edges on case interior

The $2149 DTK Feat-35 has a near-identical configuration to the Feat-38 reviewed in August, including a 486DX2-66 CPU with 4MB of RAM and a 210MB hard drive. Like its sibling, the Feat-35 yielded subpar performance—despite its larger 256K of secondary cache. To be fair, upgrading the RAM from 4MB to 8MB would boost overall performance as much as 10 percent. You get a 15-inch monitor with this PC, along with a 2MB VLB video card, one free externally accessible drive bay, and one VLB, one 8-bit, and three 16-bit slots free. DTK did a poor job finishing the inside of the case: We sustained nicks from sharp edges in the process of opening up and examining this unit. Service policies include a two-year warranty, a year of on-site service for $50, and tech support available weekdays during business hours. This machine is a spare offering; you can get faster and better-configured machines for less. *DTK Computer, 800/289-2385, 818/810-0098* **Reader service no. 790**

A new Everex—separated from the financial tribulations of its namesake—is tightly focused on producing and selling desktop and mobile PCs.

Everex Step Note DX2-50

PROS: Upgradable CPU and display, integrated sound
CONS: Nonstandard on-off, short battery life

In the past few years, the Everex name has been associated with everything from servers to notebooks, and more recently with Chapter 11 bankruptcy. Today a new Everex—infused with working capital—has separated itself from the financial tribulations of its namesake and is tightly

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focused on the task of producing and selling desktop and mobile systems.

This unit is one of Everex's modular, user-upgradable multimedia notebooks. With 8MB of RAM, a 256MB hard drive, integrated 12-bit sound, and local bus video, the $3295 DX2-50 is faster than the typical 486DX2-50 mobile PC—and the CPU and good dual-scan color display are upgradable. But the 2 hours of battery life on this 7.4-pound unit are far too brief. And the Step Note requires the use of key combinations for everyday operations such as turning the system on and off and setting brightness and contrast. You get a two-year warranty and tech support for 10 hours per weekday—but you pay the toll. Short battery life, lack of toll-free support, and a mediocre keyboard with wobbly keys hurt this notebook's rating. Otherwise, it's a fast, well-configured, and upgradable mobile system. *(At press time, Everex said it is updating both models reviewed this month with restyling, enhanced modularity, and improved battery life. —Ed.) Everex Systems, 510/498-1111* **Reader service no. 791**

Everex Step Note DX4-75

PROS: Fast, great color screen, highly upgradable
CONS: Cramped keyboard, short battery life, no toll-free support

The Everex Step Note DX4-75, like the Step Note DX2-50, is one of a new line of upgradable multimedia notebooks. It's fast—even for a DX4-75 notebook—and decently priced: $3795 with 8MB of RAM, a 256MB hard drive, and a 9½-inch active-matrix color screen. This well-built 7.6-pound notebook, like its sibling, has a too-short 2-hour battery life. The screen is among this notebook's best features, providing good contrast and rich, vibrant colors. The multimedia features, keyboard, and support are identical to those on the Step Note DX2-50. Everex is on the right track with its new Step Note line. Only the keyboard, short battery life, and toll-call tech support aren't up to snuff. *Everex Systems, 510/498-1111* **Reader service no. 792**

Gateway Handbook DX2-50

PROS: Small, light, nice hardware-software bundle
CONS: No off switch, so-so performance

This tiny subnote weighs just 5.4 pounds ready to travel with external floppy drive and AC adapter. Configured with a DX2-50 CPU, 8MB of RAM (20MB max), a 250MB hard drive, and a PCMCIA Type II slot, it costs $2999—quite a bit for a mono subnote with no direct external monitor hookup. Although you get Gateway's impressive bundle of software and a spare battery, performance is just so-so. At 4 hours, battery life is good. As with other Handbooks, the on-off button is actually a suspend-resume switch. You start up where you left off, but during extended periods of inactivity the battery gradually runs down.

The quiet keyboard is good, and Gateway provides a TrackPoint-like pointing device. You get 18 hours of support each weekday and 5 hours on Saturday. Notebook warranties are for one year. Despite the easy portability and attractive bundle, you can find better subnote deals in our Top 20 Mobiles. *Gateway 2000, 800/846-2000* **Reader service no. 793**

Insight PCI P90

PROS: Very fast, 1GB hard drive, 17-inch monitor, quality Plextor CD-ROM drive
CONS: A bit pricey, no on-site service outside Arizona

This big tower system is fast and excellently configured. So what just barely keeps it off our Power Desktops Top 20? The $4499 price. There's a lot of value in this terrifically fast Pentium-90 PC. It's loaded with 16MB of RAM (128MB max), 256K of secondary cache, and a huge 1GB Enhanced IDE hard drive. You get a fast 64-bit Diamond Stealth 64 PCI video card with an impressive 4MB of VRAM, a 17-inch ViewSonic monitor, and a quality Plextor SCSI CD-ROM drive. Expandability? Try ten free drive bays (three externally accessible), plus one PCI slot and three 16-bit slots free, along with a free shared 16-bit or PCI slot. Unfortunately, customers outside Arizona have no option for on-site service. Insight sales lines are open 24 hours, and the company says the sales staff can handle most tech support questions. If not, toll-free tech support is available 14 hours on weekdays, 12 hours on Saturday, and 8 hours on Sunday. The company also provides a fast two-day turnaround policy. This unit barely misses the shortlist and will appeal to many power buyers. *Insight, 800/998-8011, 602/902-1176* **Reader service no. 794**

Toshiba T4800CT

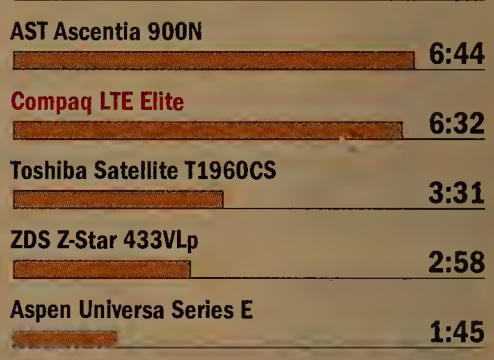
PROS: Fast performance, built-in sound, very large 500MB hard drive
CONS: Uneven LCD backlighting, heavy traveling weight

The Toshiba T4800CT has all the earmarks of a high-speed headliner for a first-class road show. With a DX4-75 CPU, 8MB of RAM (24MB maximum), and integrated local bus video, it outperforms typical DX4-75s. Furthermore, you get built-in sound, an active-matrix color screen, and a huge 500MB hard drive. Battery life is respectable—if unexceptional—at about three hours. So why then is there no Top 20 ranking forthcoming for the Toshiba T4800CT? Let's face it, at $5628 this is a very pricey notebook. And its 8.6-pound traveling weight inhibits portability. Mainly, however, the 9.5-inch display on our test unit wasn't first-class: The screen was brighter along the top edge, and the 256-color palette seemed muddy.

Support is terrific, with a three-year warranty and unlimited 24-hour toll-free support. This is a good notebook, but for top dollar we expect better portability and a flawless display. *Toshiba America Information Systems, 800/334-3445, 714/583-3000* **Reader service no. 795**

BATTERY LIFE TEST REPORT

AST, Compaq Batteries Just Won't Quit



Best Buys in red

Time in hours:minutes.

Methodology
We drain and fully recharge the battery and set power-saving options to match a consistent profile where possible. Office workers type at regular intervals in Word for Windows, saving periodically. Notebooks are rotated among workers to even the work loads. We report the time elapsed until the notebook shuts itself off.

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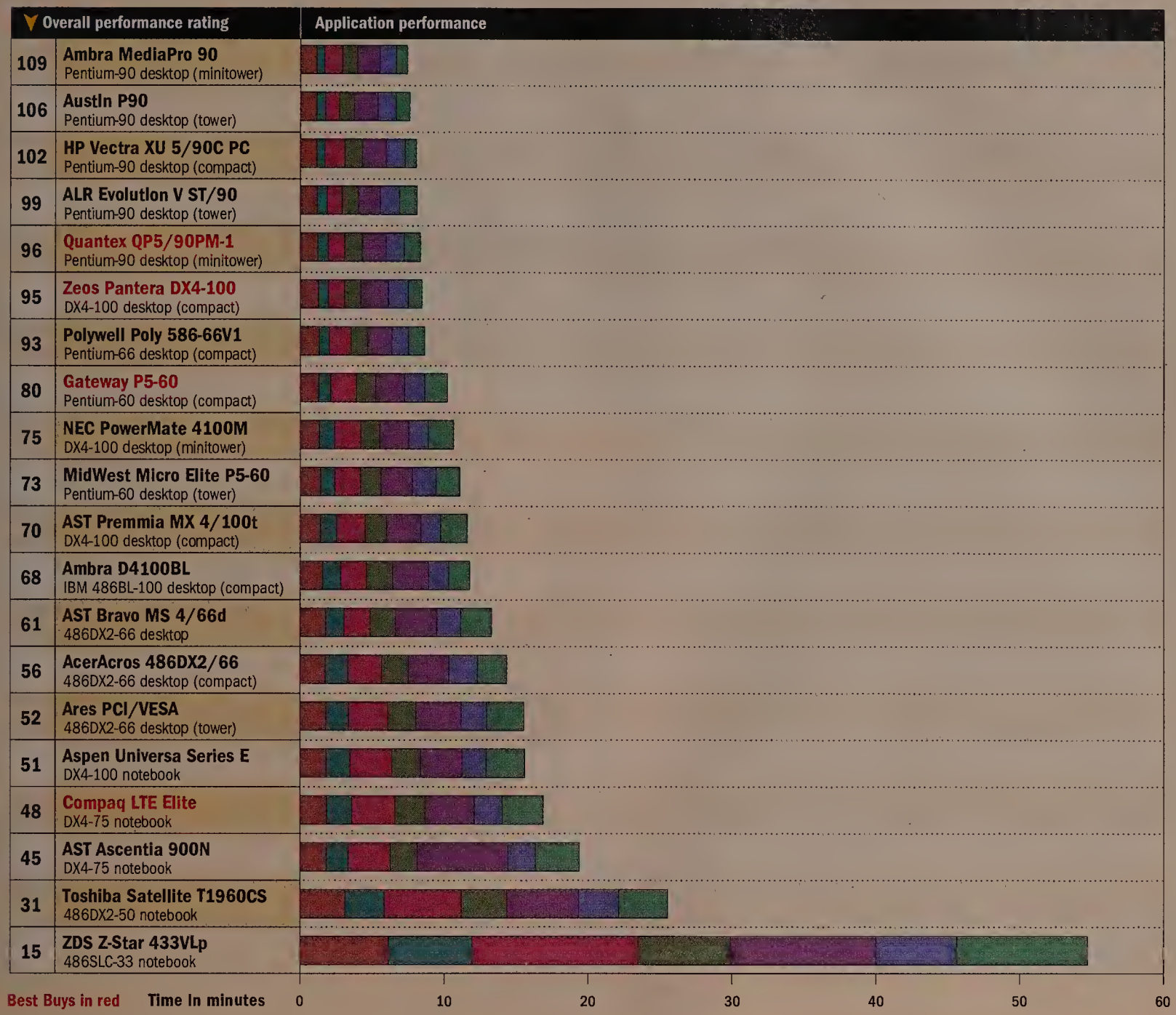
New Speed Records: Ambra for Pentium-90, Zeos for DX4-100



Systems are arranged in order of overall performance from best to worst, based on the scores from seven weighted tests.

Methodology
We tested each system as supplied by the manufacturer. We configured Windows with an HP LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. We set video resolution to 800 by 600 pixels in 256 colors, using the supplied video driver where possible. We loaded the test applications and files and test automation software and scripts.

Word 2.0 for Windows
We worked with 1-, 9-, and 28-page business documents. Operations included creating, saving, opening, scrolling, editing, checking spelling, formatting, previewing, and printing.

Excel 4.0
We opened a file and performed several data extracts, entered new data, altered calculations, formatted, scrolled, moved blocks, previewed, printed, and saved.

Paradox 1.0 for Windows
We used a custom form to add a number of records to an existing table, performed several queries, and generated a report.

Freelance 1.0 for Windows
We built a six-page presentation using a standard template, clip art, text, and charts; applied several views to the presentation; and previewed and saved it.

WordPerfect 6.0 for DOS
We performed a variety of editing, formatting, previewing, and printing tasks on documents ranging from a single-page memo to a long report. Due to memory requirements, the amount of free memory for DOS in the first 640K dramatically affects this test.

1-2-3 release 3.4 for DOS
Using the graphical Wysiwyg add-in and working in three different files, we created and altered formulas, built graphs, saved, and printed.

Paradox 3.5 for DOS
We tested Paradox 3.5 running under Windows in a DOS window. We entered data, searched records, updated, and generated reports from a simple customer list.

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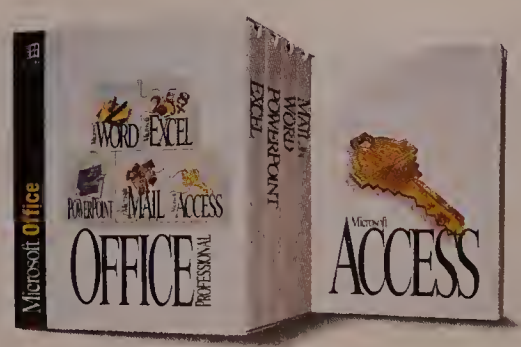
As if that weren't enough, even finding a helping hand is pretty easy. Microsoft Access comes with unlimited product support at no service charge.*

It adds up, clearly, to the first database that does everything you want – precisely the way you want to do it. And we find nothing contradictory about that. For the Microsoft retailer nearest you, call (800) 240-4782, Dept. 3HY.



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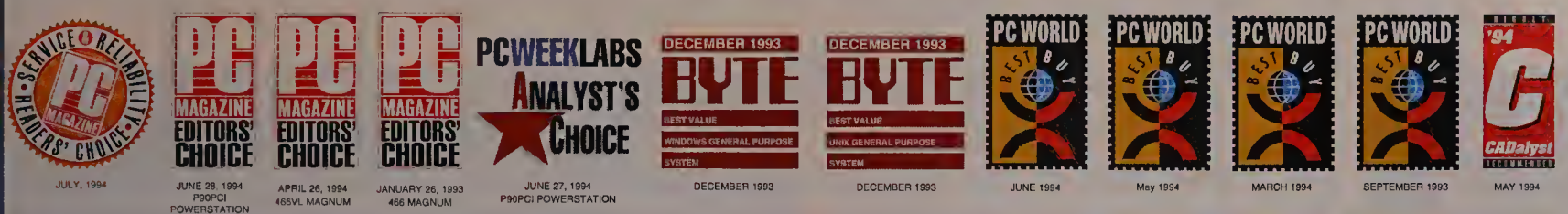

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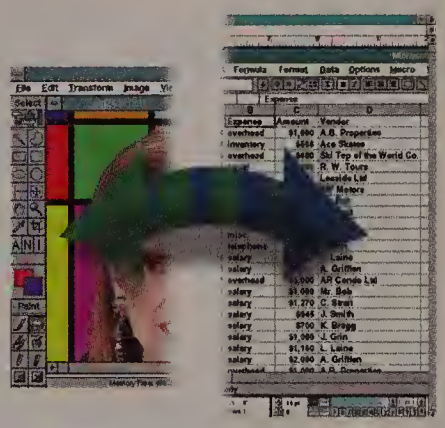
"My friend had one. Windows snapped open quickly. Charts popped up on his screen. The *blazing speed,* 37M Winmarks*, was incredible. He said it offered *best value for price/performance.* And the improvement in color graphics and detail were most impressive.



WinSwitch changes color and resolution without leaving Windows

"Then, he showed me the features. WinSwitch allowed him to switch between true color mode or high resolution mode without exiting Windows. And ATI's FlexDesk+ software gave him *total control* over color, desktop size, resolution and even motion video acceleration.

FlexDesk+ easy control of desktop settings

"Finally, he told me it was the only affordable 64-bit accelerator for my ISA system. I rushed out to buy one. *Installation was easy.* There were no switches to set and the software guided me through the installation process. And I was amazed, it even came with a complete set of drivers for Windows, Windows NT, OS/2, CAD and DOS.

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"I got the advice I needed."

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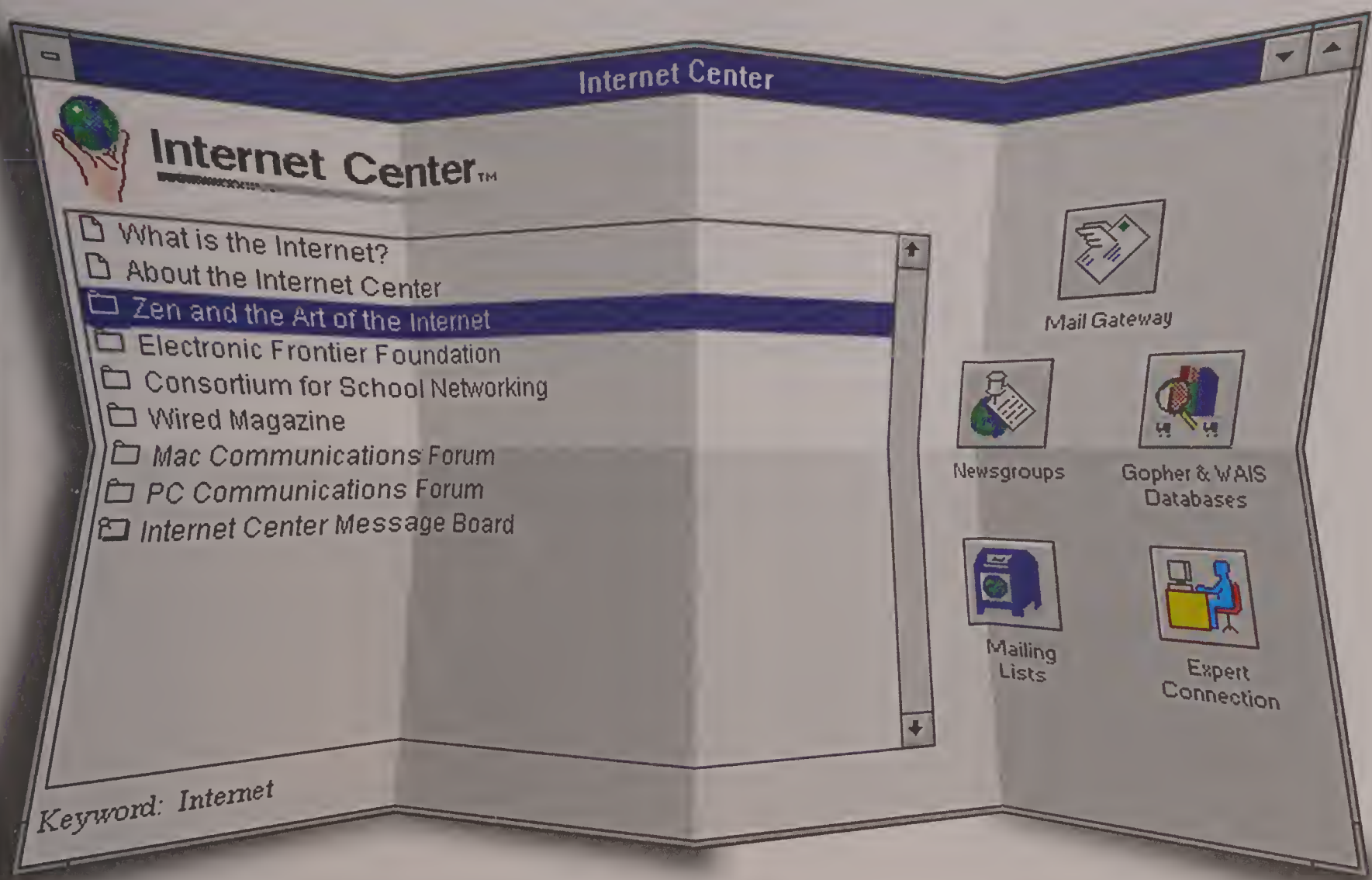

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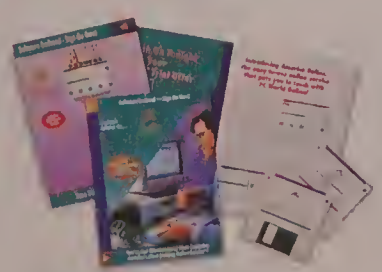

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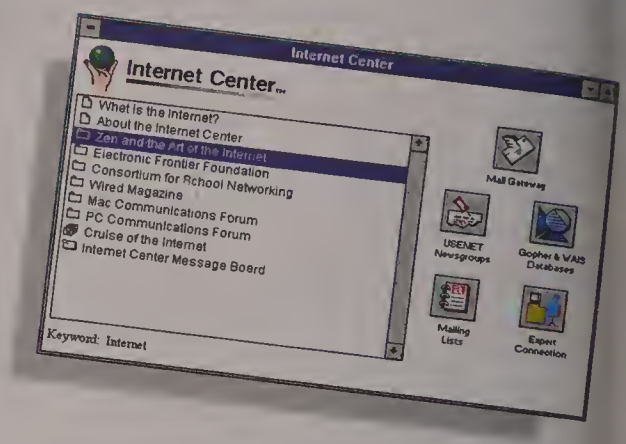

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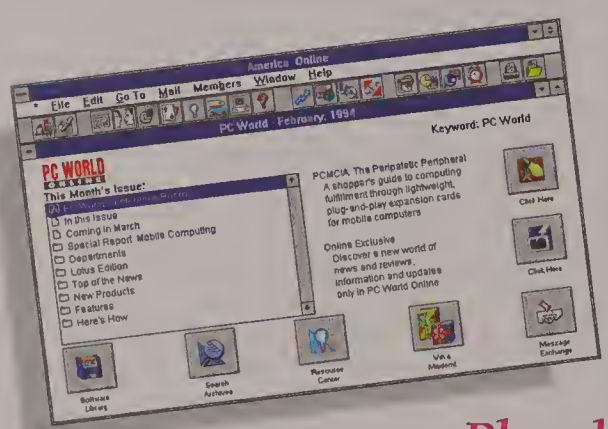

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Top 10 Windows Accelerators: Price Cuts Shake Up List

Following last month's full-blown review of graphics accelerators, "Speed Demons: Top Windows Accelerators," we look at new boards that just missed that roundup's deadline. Of the three products we tested—the TechWorks ThunderBoltVL2, the Media Vision Pro Graphics 1024, and the Alaris SkyEagle—only the ThunderBoltVL2 came close to breaking into the Top 10, though a round of price cuts has shaken up the rankings.

Street priced at $225, the ThunderBoltVL2 uses the same Tseng Labs ET4000/W32p graphics chip found on such Top 10 boards as the Diamond Stealth 32 and the STB LightSpeed. The ThunderBoltVL2 posted a respectable overall WITS score of 70.3 and includes useful software, such as a unique panning utility that lets you scroll through Windows spreadsheets by pushing the cursor to the edge of the screen. Installation and mode-selection software enhance convenience. Though we appreciate these subtle touches, in our tests the ThunderBoltVL2's performance in 24-bit color was sluggish—a characteristic common to boards based on the W32p chip.

Only the TechWorks ThunderBoltVL2 came close to breaking into the Top 10.

The Media Vision Pro Graphics 1024, on the other hand, is unique. Based on Media Vision's own MVV462 chip and equipped with 0.75MB of VRAM, the Pro Graphics 1024 board is designed specifically for 8-bit color at 1024 by 768 resolution—enough pixels for viewing large spreadsheets and on-screen forms. The odd memory configuration reduces cost, but it limits you to 8-bit color at all resolutions—a problem with high-res graphics or multimedia. The $269 board posted a 69.9 overall WITS score, including a stunning 12.6 score in PhotoStyler, and offered smooth installation and adequate graphics software. But the inherent color depth limitations and relatively high price keep it off the Top 10.

Finally, the $159 Alaris SkyEagle uses NCR's new 77C32BLT graphics chip and 1MB of DRAM to appeal to cost-conscious buyers. But the board's overall WITS score of 63.2 puts it well behind Top 10 contenders, though installation was refreshingly simple. So unless you deal almost exclusively with text-based E-mail and basic documents, you'll want to pay a little more for better performance.

WITS was developed by Jon Peddie Associates, a consulting firm specializing in PC graphics technology. Jon Peddie and Fred Dunn are the principal officers of Jon Peddie Associates.

TOP 10 ACCELERATORS

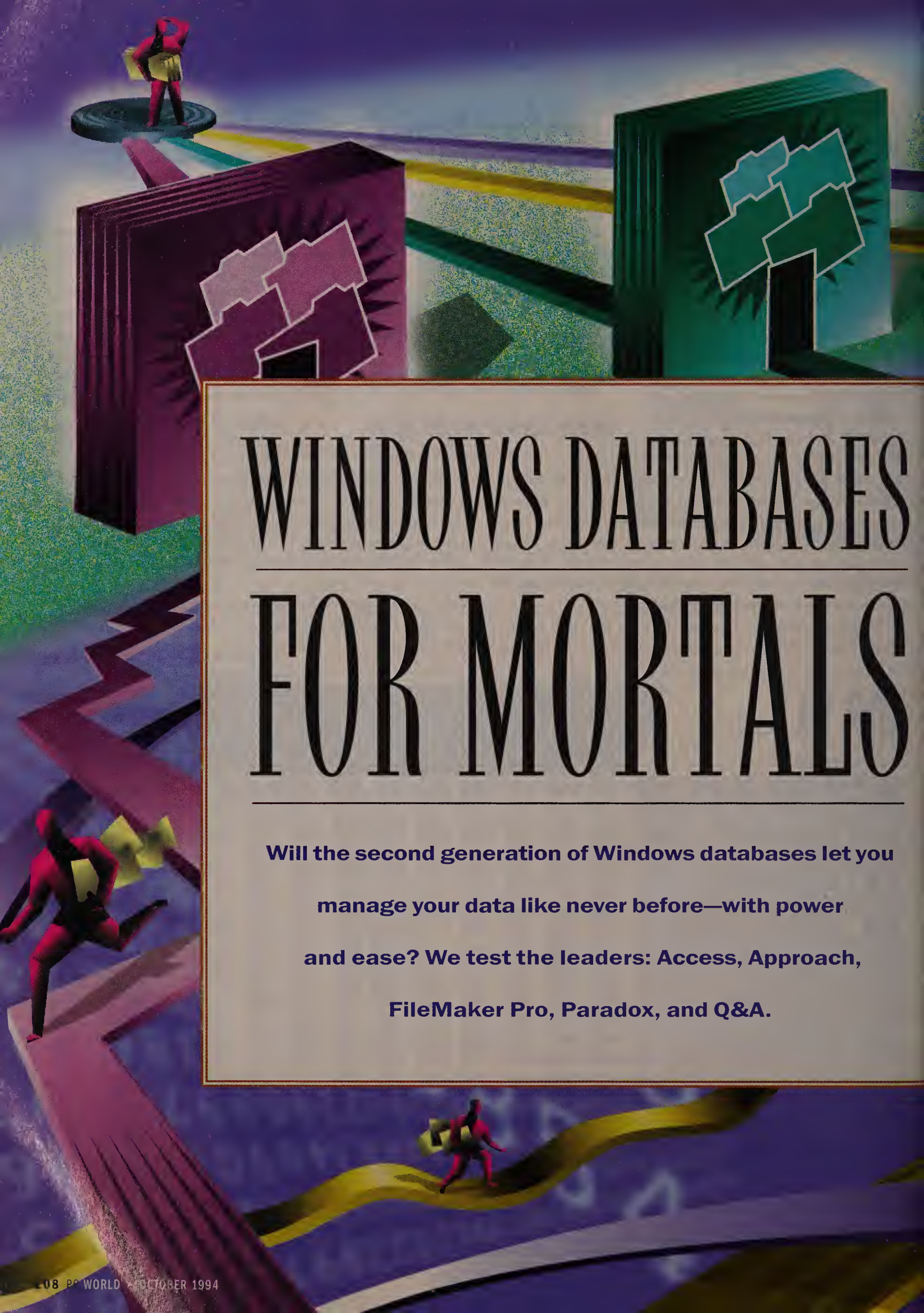
New this month
Up from last month
No change from last month
Down from last month

		Overall value	Estimated street price	Windows Integrated Test Suite scores: Word 2.0 for Windows	Excel 4.0 for Windows	CorelDraw 3.0	PhotoStyler 1.1	QuarkXPress 3.11	Freelance Graphics 2.01	Overall WITS score	RAM (MB/type)[1] Bus type	Chip/ driver date	Reader service number
1	ATI Graphics Xpression 905/882-2600	93	$250	13.4	16.6	13.2	11.6	15.6	4.8	75.1	2 / D PCI	88000CX 4/11/94	613
2	STB LightSpeed 800/234-4334	92	$199	12.5	14.5	12.6	11.4	14.7	5.9	71.5	2 / D VL	ET4000/W32p 4/10/94	617
3	Diamond Stealth 32 [2] 800/380-0030	91	$249	13.6	15.5	13.3	11.5	12.2	6	72.2	2 / D PCI	ET4000/W32p 12/29/93	614
4	Diamond Stealth 64 [2] 800/380-0030	90	$315	13.5	17.9	13.1	11.2	12.9	8.5	77.1	2 / V VL	Vision964 4/1/94	614
5	Number Nine #9GXE64 800/438-6463	90	$249	12.8	14.7	10.3	11.5	14.3	6.5	70.1	2 / D PCI	Vision864 4/26/94	616
6	Number Nine #9GXE64 Pro 800/438-6463	90	$356	13.7	16.8	12.9	11.9	15.6	8	78.8	2 / V PCI	Vision964 4/26/94	616
7	Boca Voyager 407/997-6227	90	$145	12.6	13.8	12.8	11.6	14.1	4.6	69.4	1 / D VL	F64300 3/22/94	615
8	STB Nitro 800/234-4334	90	$189	12.2	13.4	13.1	12.6	14.7	4.1	70.2	2 / D PCI	GD5434 2/18/94	617
9	ATI Graphics Pro Turbo [2] 905/882-2600	88	$380	13.6	17.9	13.6	11.6	16.2	6.7	79.7	2 / V PCI	88000GX 4/11/94	613
10	Hercules Dynamite Power VL 800/532-0600	87	$215	12.7	14.2	12.8	11.3	14.4	5.5	70.9	2 / D VL	ET4000/W32p 12/1/93	618

Methodology Boards were tested at 1024 by 768 resolution at 256 colors and a minimum 70-Hz refresh rate on a 486DX2-66 with 16MB of RAM and 256K of secondary cache. Application scores are the factor by which a board exceeds our baseline system, an unaccelerated ET4000-based VGA adapter on a 386DX-25 with 16MB of RAM. The overall value score balances performance, estimated street price, and features. The overall WITS score is the aggregate of the application scores. For all scores, higher is better.

[1] D = DRAM, V = VRAM.
[2] Similar value offered by other bus types tested.

For more information about all products in this table, circle reader service no. 901.



WINDOWS DATABASES FOR MORTALS

Will the second generation of Windows databases let you manage your data like never before—with power and ease? We test the leaders: Access, Approach, FileMaker Pro, Paradox, and Q&A.

BY JEFF ANGUS AND MICHAEL S. LASKY

Software publishers like to boast about how easy their applications are to use, but it takes end users to test vendors' claims in real work situations. We've all heard and read the hype about software simplicity, and we've always wanted to believe it. Wouldn't it be swell to prove once and for all that "easy-to-use database" is not necessarily an oxymoron?

So when the major database management vendors—Lotus, Microsoft, Borland, Claris and Symantec—first marched out their new systems written specifically for the Windows platform, each of them bragged louder than the next that its full-featured powerhouse was easy to use. Not.

When users griped about the lack of simplicity in those early versions, the software companies promised improvements. Now they've rolled out these second-generation Windows databases, and once again each publisher is saying that *this time* its database package really is easy to use. Really.

As the old saying goes: Fool me once, shame on you. Fool me twice, shame on me. To find out just how easy the five leading Windows database packages are to use, the PC World Usability Lab evaluated Microsoft Access 2.0, Lotus's Approach 3.0, Claris's FileMaker Pro 2.1, Symantec's Q&A 4.0, and a beta version of Borland's Paradox 5.0 for ease of use and functionality (Paradox 5.0 is discussed separately in a sidebar). Our evaluators all had a moderate amount of experience using various Windows and DOS applications.

OUR USABILITY LAB TESTING TEAM: Dean Andrews, Rose Cowden, Amanda Lewis, Susan Silvius, Greg Smith, and Tim Warner

The packages we reviewed had a range of functionality, but all boasted one feature in common: All of them claimed to be easy for end users to work with.

Claris FileMaker Pro 2.1 ($399) is a flat-file, nonrelational program. Its ease of use and unintimidating interface appeal; the trade-offs are a 32MB database size limit and the lack of server-based SQL data connectivity. A simple point-and-click system lets users construct input forms, queries, and reports without complex database mumbo jumbo. Calculated fields are supported by more than 60 macrolike functions, all accessible by pointing in a pop-up window. Each database supports numerous layouts—one better suited to data input, another for querying, and so on. The package's Macintosh roots are exploited to allow its databases to run on both Macs and IBM-compatible PCs, great for multiplatform organizations.

Lotus Approach 3.0 ($495) offers an interface makeover that uses a tabbed notebook design alongside typical drop-down menus. Now you merely click on an appropriate tab to bring up the various form, report, and label design areas you need. Within these tab-based dialog boxes, a user-customizable InfoBox with context-sensitive help lets you change properties of fields, text, and other objects. The tab metaphor carries through even to 3.0's new automated online help Assistants, where each tab equals one step in a design or query process. Approach's new Worksheet View lets you browse and change information in a tabular spreadsheet format for a better overview. Approach is also fully integrated with other Lotus applications such as Ami Pro, 1-2-3, and Notes, and it supports OLE 2.0.

Microsoft Access 2.0 ($495) offers power to spare with its improved database engine for faster querying performance. A vast array of Table Wizards guides you step-by-step through the table definition process, letting you easily determine the relationships between the table's various elements and see how the table links to other established tables in the database. The graphical representation of all tables, with lines linking the current active relationships, is a boon to comprehending database connections. Similarly, an Access Query window has been added that represents your tables pictorially with a unique, scrollable grid that allows you to create queries quickly. Access also dovetails nicely with other popular Microsoft applications, such as Word and Excel.

Symantec Q&A 4.0 for Windows ($249.95) uses a spreadsheet metaphor for its flat-file database functions. This structure provides simplicity but in the process sacrifices the flexibility and power that its relational database competitors provide. Simplified querying is handled by an automated assistant, a feature that guides users through a series of menu choices and simple commands. Report creation based on the typical spreadsheet columnar design is as easy as free-form custom design.

BEST BUYS

FileMaker Pro 2.1 has enough power to handle most basic tasks. It works within work groups, but it offers minimal relational capability. Our evaluators found it by far the easiest product to use, and it wins a Best Buy for fundamental database tasks.

Access 2.0 is a respectable Best Buy for middle to high-end users. It still has a steeper learning curve than Microsoft would like people to believe, but there's no denying that Access brings the power of high-end relational databases to nonprogrammers without compromising capability.

Which One's for You

Your level of database experience and the extent of your data manipulation requirements are the two key factors that help determine the type of database package that you need. We approached our usability review under the assumption that database users fall into three general categories:

Basic. Simple list management, index card sorting, and queries and reports are what this largest group needs. These users typically rely on spreadsheets or on a vanilla flat-file system such as Windows Cardfile to maintain and track data lists. Their wish list includes a way to exploit data better in a more versatile and user-customizable data manager. The best bets for these users are FileMaker Pro and Q&A.

Intermediate. More at home with database packages, these users—no doubt graduates of DOS products—want a broader range of functions to manipulate and share a wide variety of data easily. They are typically willing to invest more time learning a product in order to get results they need. These users need databases that offer network data sharing, data linked between the database and other applications, complex reports from multiple databases, and macros for automating some tasks. For this group, Microsoft Access and Lotus's Approach are appropriate products.

Advanced. These data directors develop complex database applications using a programming or scripting language. Advanced

Basic users typically rely on spreadsheets or on a vanilla flat-file system such as Windows Cardfile to order, maintain, and track information lists.

users direct mission-critical database tasks and usually have in-house programmers or outside consultants at their disposal. Borland's Paradox and Microsoft Access are power programs worthy of advanced users such as these.

Reality Test

We designed our usability tests around the typical tasks database users need to accomplish most often. We created a test script that followed the testers from installation through designing a simple database (creating the data entry screens), adding records to the database, requesting specific information from the entered data, and creating and printing a report.

With every one of the programs, installation was the easiest aspect for all our testers to manage. From that point on, each package presented its own individual collection of pros and cons in the ease-of-use contest.

Can You Build a Database From Scratch?

Just as you need blueprints before you can erect a building, you must lay some groundwork before creating a database. The bricks and mortar of a database are field definitions (names, addresses, titles, products, dates, and so on). How each field is formatted (text only, numeric only, text and numeric) and where it appears on the screen are also important considerations during the planning stages. If planned correctly, these

IT'S A PARADOX: IT'S EASY AND IT'S NOT

Paradox for Windows is based on an immensely successful DOS product. Loaded with powerful features for developers, it has perhaps the richest programming environment of any relational database product for the PC. Despite some ease-of-use improvements in this latest version, however, there are significant shortcomings for those who need a database for only simple list management, queries, and reports.

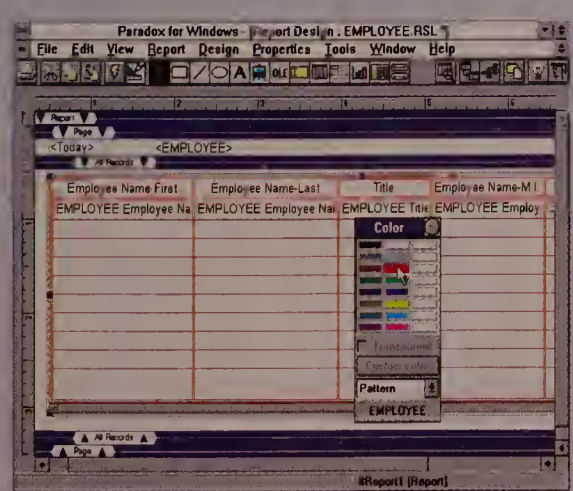
Building on Paradox for DOS

Looking at the Windows product, it's clear the designers based it on the DOS version, which received acclaim for its ease of use. The paradox of that strategy is that good Windows design and good DOS design are an ocean apart. Take, for example, the PC World Usability Lab testers' need to resize fields. The experienced Windows users expected to be able just to click the mouse on the field and then resize it, and they were frustrated when that tactic didn't work. Nor did they appreciate the extensive role of function keys for moving from mode to mode or executing functions, though most of the DOS users took to it readily enough. And the menu structure needed to support the Paradox feature set was so enormous that occasional-use testers were easily lost.

Paradox for Windows' roots are also to blame for the stumbling block novice users encounter trying to enter data. Many testers wanted to get information into the database in an ad hoc way: create a few fields, add data until they confronted a record that needed additional fields, edit the file to accept the new fields, and so on. This circular method is not a problem in the simpler products, but Paradox makes an important (and for basic users, a false) assumption: You embark on building a database with the same planning and thoroughness you would in building, say, a bridge over the Mississippi. If you approach database creation in a structured way, the Paradox model will support your work well. If you expect to do ad hoc development, you are using the wrong database package.

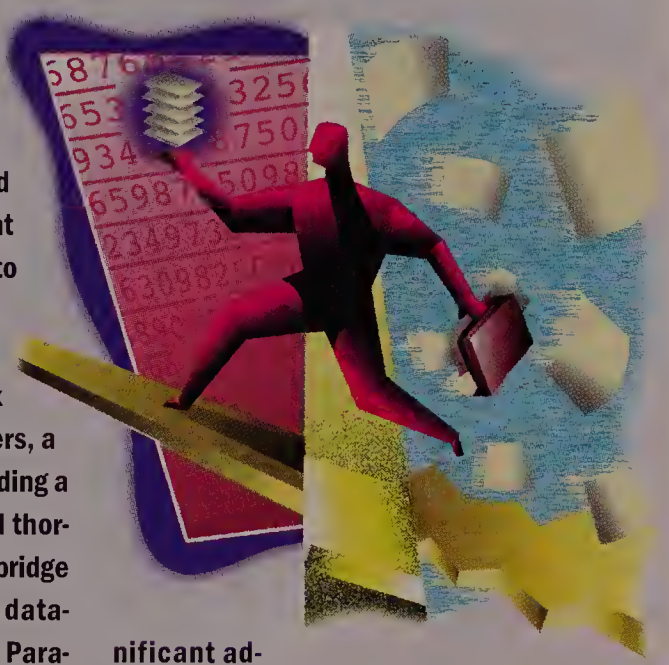
Coaches and Experts on the Way

Again, Paradox's multiple modes and sophisticated features got in the way when testers tried to make an ad hoc query. The shipping version of Paradox is expected to have the automated Coaches and Experts help to cut through the complexity, but those features were not available in the beta version we used.



PARADOX 5.0's powerful report design module doesn't let power overwhelm its usability. For example, it's simple to change colors by right-clicking on a location.

Paradox 5.0 features a full panoply of standard import formats and can import Quattro and Excel files. Because the product has the capability to read dBASE files as if they were native to Paradox, there is no need to import those files and then convert them. Paradox can also save import specifications, a significant advantage during those chronic data conversion efforts that plague many organizations.



Although Paradox's Report Designer module is the most powerful in the group, some of our testers took its added complexity in stride (one created a printed report on the first try in 3 minutes). But, alas, creating reports was another area where most of our testers' ad hoc work styles made Paradox a bad match. Some of them realized—only at the point of issuing a report—that they needed to redefine their database's fields.

The final version of the product will have additional enhancements, but it's obvious that most of the ease-of-use improvements made to this product were aimed at Paradox's core market—programmers and developers—rather than average business users.

—Jeff Angus

aspects make data entry a breeze, and producing reports based on the data input is much easier to master.

Database packages attempt to simplify this planning by offering transparent functions, known as *masks*, which allow you to assign each field's limitations. In this way you can dictate, say, the allowable size of the number to be input or the minimum or maximum number of characters to be entered in a field. For example, you could create a ZIP code field that required exactly 5 or 9 characters, had a hyphen inserted after the 5th character, and accepted numerals only, including leading zeros.

Preconfigured templates are software publishers' latest method for making each step of database creation easier. While you can still define a database from the ground up, templates give you a head start in the creation process. The templates are preformed but still customizable, allowing for field definition changes. With each of the packages, *PC World*'s testing panel discovered the respective benefits and pitfalls of template-based and free-form creation.

Access has an outstanding set of predefined templates that work for customer tracking, invoices, and inventory, among other purposes. Its template interface allowed even the rawest rookies to customize a template.

FileMaker Pro also provides template-style building blocks for starting a new database. Its small manual, dedicated to explaining how to use the templates, made

DATABASE DESIGN TIPS

Once you've picked the right tool, you still need to put your database to use creating applications for personal, work group, or organizational use. These nine tips should help you go about it the right way.

1 Think ahead. Don't just plunge in. At the design stage, you can think about all the future directions of the project and plan for their implementation from the start.

2 Allow for extra design time. Organizing tables and data, designing forms, establishing the connections between different data items, deciding precisely what reports you will actually need—this level of detail may seem unnecessarily nitpicky when you want just to dive straight in, but later changes can require you to back up all the way to the beginning. If you know exactly what you want to achieve before you start the database creation process, you can design right the first time and save tenfold on troubleshooting later.

3 Break down the data as part of the design process, and build it up again to simplify and clarify the database. Without going over the data rigorously and dismantling it into all its parts, you won't be able to find all the duplication of data fields and formats that occurs in every database. Reusing parts of the design and keeping data formats common and consistent can make your overall model much simpler and smaller. As your database grows, you may come to regret any unnecessary complexity or duplication in the data.

4 Allow for future change whenever possible in the design process. Many successful database applications sow the seeds for future growth. Once an application proves its worth to the organization, users and managers ask for improvements, refinements, and extensions. It helps to plan for this growth from the start. To make changes even easier, plan for the application to be implemented in stages, relegating useful but unnecessary operations to second and later stages, after the project's core is up and running smoothly.

5 Document everything—the data, the structures, the forms, and the tables—and explain the reasons for its existence. This *data dictionary* will be turn out to be invaluable later. Such documentation will help clarify your understanding of the project and can lead to important simplifications and regrouping of the data.

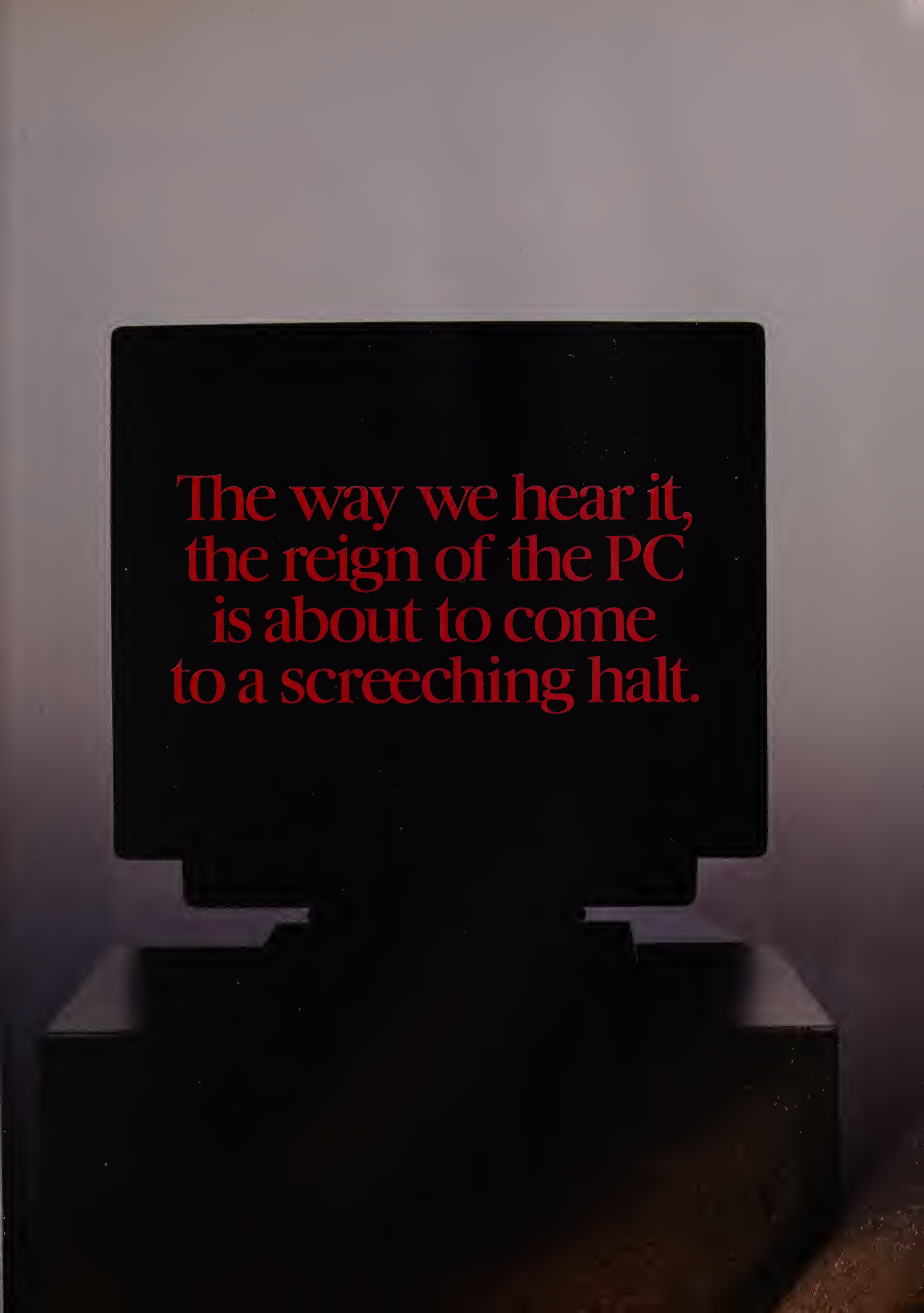
6 Have the intended users of the final database application give input and feedback throughout the design, implementation, and testing processes. Your end users need to be able to use the forms and reports that you are creating. Make sure that they are allowed to express their preferences and to provide feedback. From their daily work with the data, they will have many important insights.

7 Protect and back up data constantly. You don't want to lose important information because of accidents or errors in your application design. Build backup procedures into the database application itself to automate data security.

8 Keep it as simple and lean as possible. The simpler your database structure, the easier it will be to understand later, and the easier it will be to extend it. Reusing components, such as dates and customer numbers for ordering dates and shipment dates, can help you keep your design simple.

9 Before committing your valuable data, do a trial run with all the parts of the database application to make sure everything works together. Plunging right in with your real data is courting disaster. If your application doesn't work right, you not only risk losing important data but also hazard mixing it up so badly you can't straighten it out.

–Owen Linderholm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the process easy for our usability testers. The templates work not only for the basic design of the data entry form, but for later use in query output. FileMaker Pro is a simpler product than Access, so it doesn't require the same level of definition for each data field. Simplicity, however, comes at a price: More powerful features, such as valid entry verification, were hard to find and not well explained in the dialog boxes. FileMaker's well-written documentation helped the testers understand how to use these features, but more built-in self-explanatory interface components would definitely have been appreciated..

Q&A's approach to data field definition seemed simple to our testers. The forgiving nature of this database—it allowed quick overrides of predefined fields—along with an animated tutorial helped our testers conquer field creation. And data structures can be formed with just field names and types, while all of the components that render field definition complex, such as decimal places, data masks, field sizes, and so on—are stored in a data structure bank. The problem is that the format for data structure creation looks like a spreadsheet but doesn't act like one.

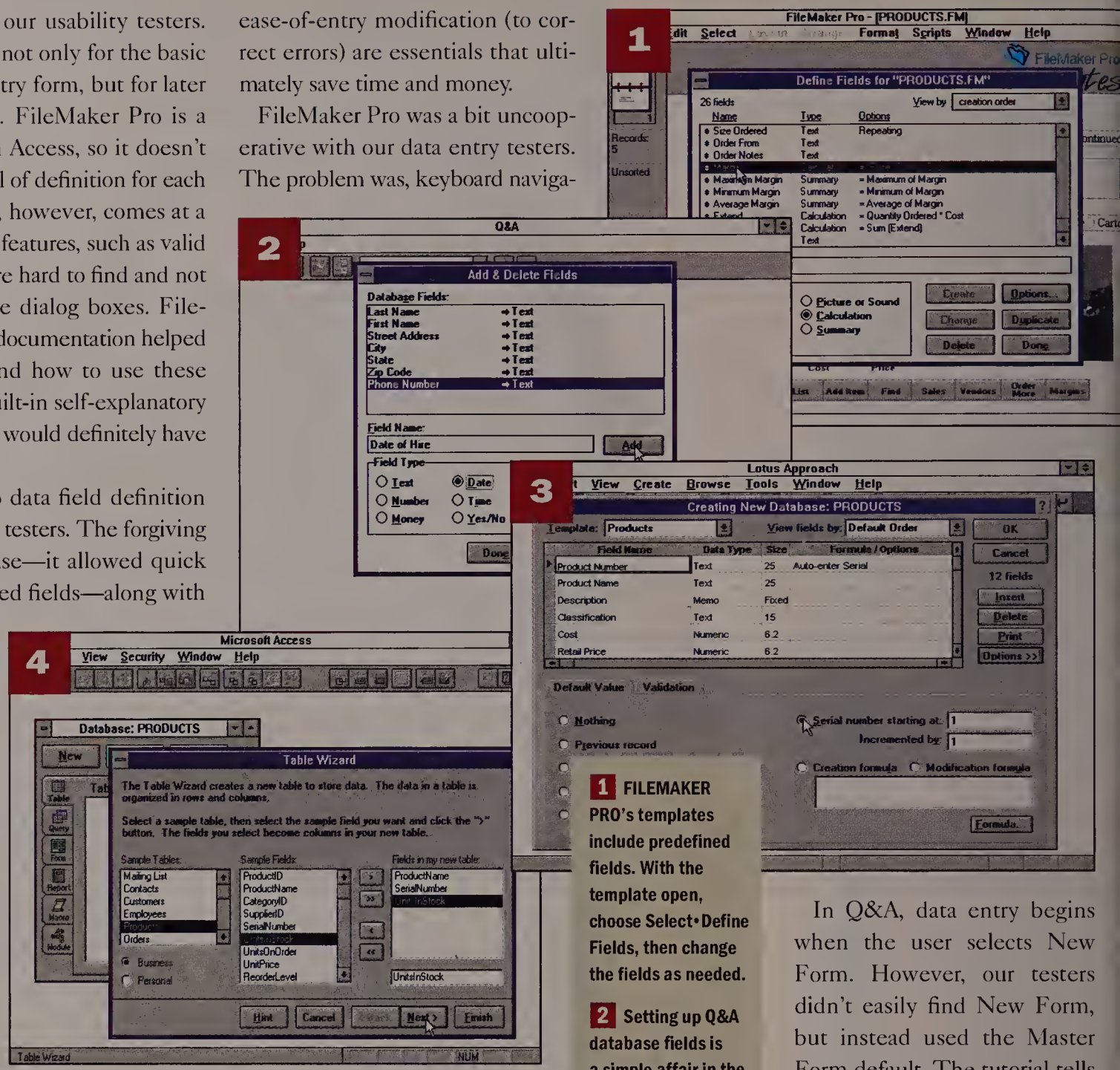
Approach is similar to FileMaker Pro with its ready-made templates, but our testers found it confusing to try to update or modify them. Some of the templates were also found to be poorly labeled. In fact, defining and setting up fields without the templates was easier. And again, while similar to the flat-file FileMaker Pro in functionality, Approach is a fully relational database with high-end features, such as more direct support for foreign file formats.

Feeding a Database

Data entry is often considered a mindless task, but it's critical that data be put into a database carefully and efficiently. Besides cutting training time, good intuitive packages make data entry forms look just like their paper counterparts and facilitate moving from field to field easily. Shortcuts and ease-of-entry modification (to correct errors) are essentials that ultimately save time and money.

FileMaker Pro was a bit uncooperative with our data entry testers. The problem was, keyboard navigation commands were far from intuitive. The <Enter> key, our first choice, gave an extra carriage return in the current field. Instead, it took mouse clicks or the <Tab> key to change the field. Both the manual and online help reinforced using <Tab> navigation.

Once our testers found the data entry area and learned to navigate it, they had little trouble adding data—though none was confident enough to experiment with fonts, colors, or borders. FileMaker Pro did slow input because it has only basic data masks. Masks, as discussed earlier, are the formatting options used in field creation that let users enter, say, just a phone number's numerals and have the program automatically add the parentheses and dashes where needed.



1 FILEMAKER PRO's templates include predefined fields. With the template open, choose Select•Define Fields, then change the fields as needed.

2 Setting up Q&A database fields is a simple affair in the Add & Delete Fields dialog box, though Q&A makes you go elsewhere to set up the field's attributes.

3 Select an APPROACH template name from the drop-down list and then modify the fields and settings as you like. Users may encounter confusion in getting here, however.

4 ACCESS eschews templates in favor of Wizard, which gives you lists of sample tables and field names to select.

In Q&A, data entry begins when the user selects New Form. However, our testers didn't easily find New Form, but instead used the Master Form default. The tutorial tells users that it's best not to use the Master Form for data entry, but never says why and it was the Master Form that popped up after the testers created their custom forms. Working with the Master Form requires you to reedit it every time you create a new form, because data from the last form is still there.

Q&A allows you to move from field to field with <Tab> or <Enter>. That might seem like a small consideration, but it's the type of interface design that speeds up data entry. Q&A was also the most tolerant of non-standard characters in fields. For example, adding a parenthesis or dash in a phone number field brings up a message that the data does not match the defined format—and then offers you the option to override. **continued on page 222**

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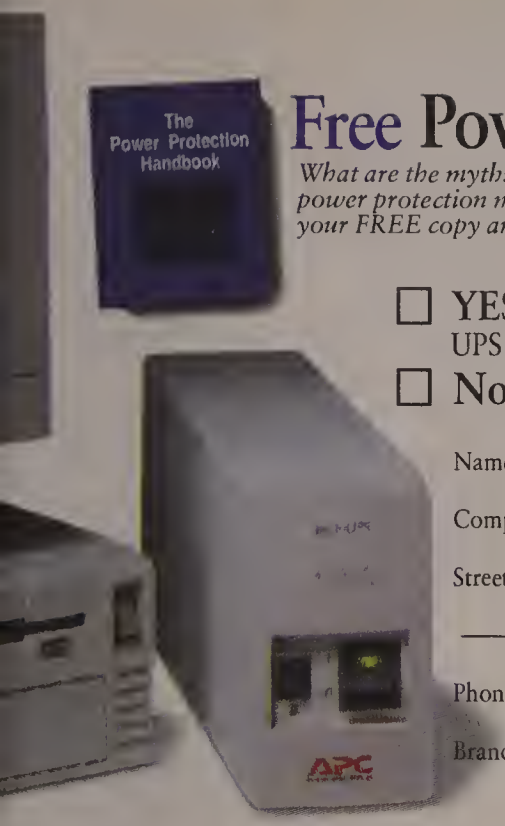

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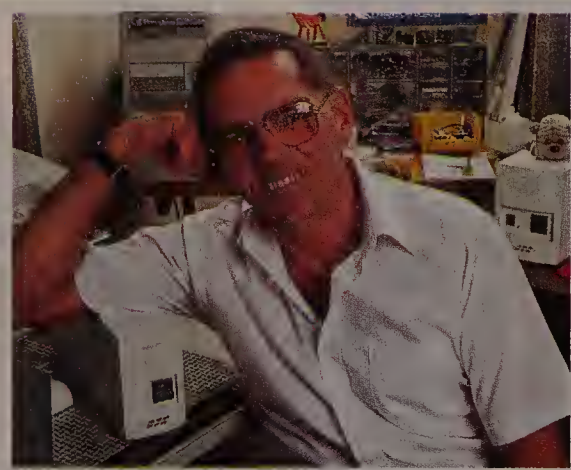

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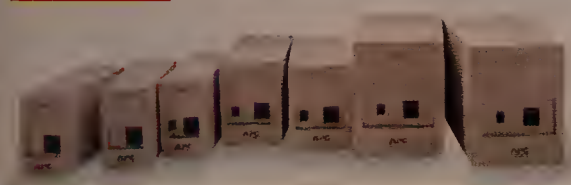

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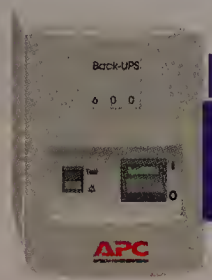

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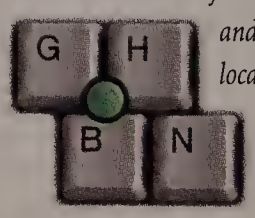

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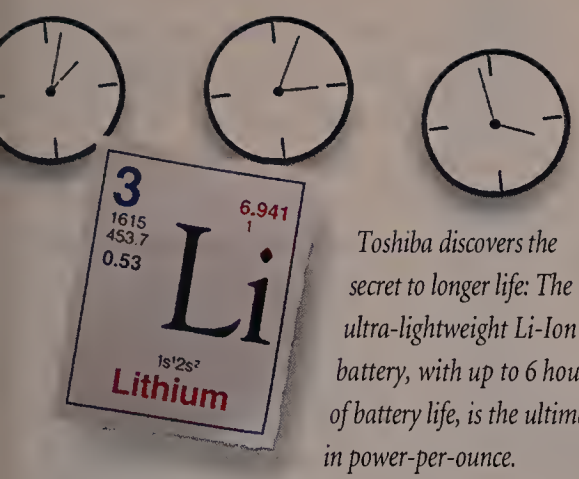

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Circle 228 on reader service card

This practical compromise—warning you about the possibility of an error, yet tolerating the entry—allows data entry to proceed unhindered.

The testers quickly discovered that field-to-field navigation in Approach is done with the <Tab> key alone. Data follows simple masks established when the form was created. As you type data, it's fitted to the expected format. You can still enter the data free-form by selecting an obscure check box in the Format Properties dialog box, but the program defaults to using the mask. New to Approach 3.0 is a worksheet view that lets the user enter data as if it were in a spreadsheet (1-2-3, natch). This technique affords the capability to view a wide range of records while entering new data—great for productivity, since it gives a visual double-check on recent data entry.

Testers had no issues with data entry procedures in Access and found it particularly easy if they had prior experience with Microsoft's Excel. One tester said achieving

A HELPING HAND: HIRING A CONSULTANT

Developing database applications within your organization is a compelling idea and, particularly for quick-and-dirty applications, remarkably effective. But don't fool yourself: For a big project, you really should think about going outside of your organization. There are three circumstances where you'll need to turn to a hired gun. The obvious one is if your organization doesn't have an MIS group or dedicated database and computing specialist. Second, even if you have the needed talent in-house, that personnel may be unable or unwilling to work on your schedule. Finally, based on previous experience, you may not trust your MIS department to handle the project.

Working with outside consultants can be tricky. Knowing exactly what you want from a consultant before selecting one is critical. Here are ten tips to help you in that process.

1 Think about your long-range needs before you hire a consultant. You may want a consultant who can manage not only the current project but also many future needs. Look for someone who can handle the range of possibilities entailed.

2 Choose the right *kind* of consultant. There are specialists and generalists whose expertise ranges from practical matters to strategic planning. You will probably encounter systems integrators, who tend to work only on major strategic issues; generalist VARs, who will sell you a complete turnkey package—hardware, software, and solution in one; single product specialists who know one database product well and use it to solve all their diverse client needs; vertical developers who use a range of tools to provide solutions in one area of expertise; as well as specialist VARs who sell packages tailored to a particular business need.

3 The best place to start looking for a consultant is through personal recommendations. But make sure the consultant is capable of solving your particular problems, not just those of the friend who made the recommendation. If you find a consultant without a personal recommendation, ask for—and check—references. Try to find out what problems there were, if any.

4 Before committing to anything major, have the consultant do a pilot project. If you are planning to use this consultant for a mission-critical application, or if you want to use the consultant for many years to come, do a test project first—something you need done, but that won't hurt you if it isn't done right. If possible, make this test project match the scope of your real need.

5 Don't assume that whatever tools you planned to use can really do the job: Have the consultant confirm the feasibility of completing your project using the proposed tools. Run a test first, even with meaningless data, to make sure the database tool you choose can handle the job. The consultant needs to help with this phase to ensure that he or she will be able to work with that tool.

6 Carefully describe and document the final product you want. Don't leave anything out, however small. That way, the consultant will fully understand what you want done, and the final result will be complete. Total disclosure also allows the consultant to make a realistic bid—one that won't need to be adjusted later.

7 Clarify accountability and responsibility for all parts of the project. You may have resources within your organization that are slated to help with or complete part of the project. Make clear what the consultant is responsible for and what your organization is responsible for. This includes who bears the cost of incomplete parts or overruns and who benefits from any time or money left over at the end of the project.

8 Build multiple, measurable milestones into the project. Such planning will help you control and manage the project and ensure that clear progress is being made at every step. It also helps you gauge the consultant's performance on the project.

9 Deliver promised help to the consultant in a timely fashion. If you or your organization has the responsibility to deliver data or other assistance, don't keep the consultant waiting—just as you don't want to be kept waiting. Remember, delays are expensive.

10 Allow for cost and time overruns in your planning. Database projects are inevitably time-consuming and costly. Plan for this so that you won't be devastated later when the inevitable delay occurs.

—Jeff Angus

tasks in Access was incredibly simple with the Wizards. Data entry was straightforward even without Wizard assistance.

Modifying an Existing Database

People's needs change, mistakes are made; and databases need to be modified, updated, or restructured. While creating a database form design might be fairly uncomplicated, we asked our testers to find out how simple it is to alter an existing form.

A good database package should help this evolution of forms happen easily—but not so easily that an impulsive change causes the loss of valued data.

FileMaker Pro let our testers quickly and easily add and delete fields on their forms. Changing data type in fields was as fast as a mouse click. Each time a change was made, FileMaker Pro sent a fail-safe warning box, asking if the tester wanted to change the existing design. All our testers liked this safety feature.

Q&A created more Q's than A's for our testers in their attempts to edit data fields. Part of the problem was the separation of the two data definition areas. For example, the field name and data type dialog boxes are under the Database menu, while the more advanced features—such as field-delimiting masks—are under the Select menu. This unintuitive interface was irksome, to say the least, and one of our testers spent several minutes trying to find his way back to the right dialog box.

Access sacrifices speed for security, and its more advanced data model created some small barriers for testers. In the interest of data integrity, Access does not let you modify the structure of a table if a form using that table is open. This caution is logical, since you'd create chaos if you changed the structure of a table in the middle of adding records to it. But the error message never cues you as to what to do or how you made the error. None of our testers found it easy to figure out how to accomplish the task, though each of them was able to complete it by using either the written documentation or the online Cue Cards.

Approach's model for changing a database design wasn't any more difficult than that of Access—once the testers figured it out. Getting to the design mode was not intuitive, and a change to the structure was not always immediately reflected visually. This lack of response proved annoying to the testers who expected, reasonably enough, to see their changes reflected on screen in the current form.

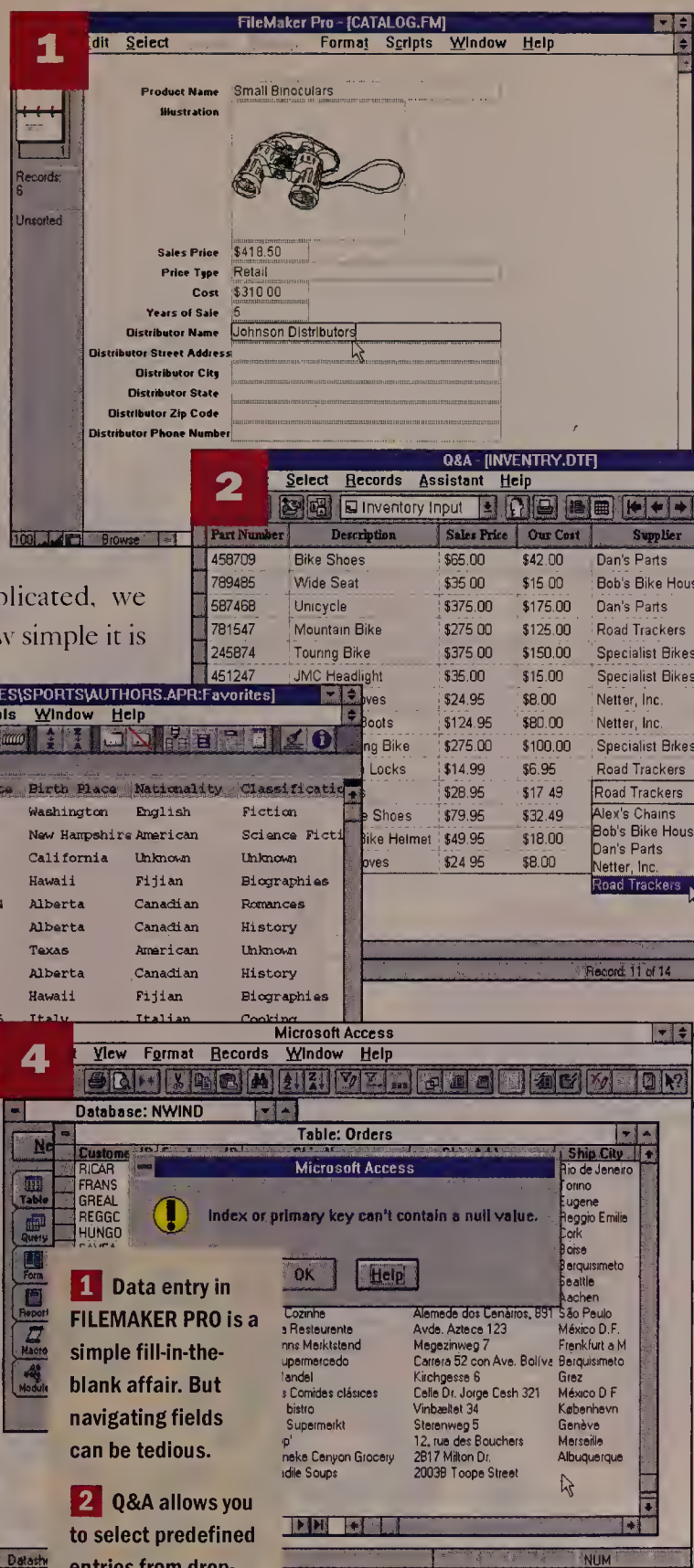
Getting Data From the Base

You've created the forms and tweaked them. You've input data. Now you want your database to produce some answers to your queries—be they simple alphanumeric sorts, requests for listings of selected fields (i.e., names and phone numbers), or correlations between fields (for example, all names and phone numbers from select ZIP codes).

Good packages provide tools to easily define what you want to see, how you want it sorted, and how you want it formatted on screen or paper. Moreover, it should be easy to put together a quick query, as well as to save frequently requested queries so you need not define them each time you need to run them.

FileMaker Pro's querying was a piece of cake. Since the product is, at its core, an electronic index-card box, it features a Rolodex-like display in the upper-left corner. You can move back and forth through the file one card at a time, by clicking on the Rolodex, or quickly traverse your forms by clicking a scroll bar. For speedy querying of different scenarios, you can build as many "layout designs" as you need—one layout form that shows one record at a time, for example, and another that arranges various selected fields in a columnar list to show the big picture. Though our testers found it was simple to query fields that deliver statistics on other fields (such as average price per item in a sale), they had some difficulty making summary fields, such as the average sales total by selected sales personnel.

Our testers appreciated Q&A's intelligent



1 Data entry in FILEMAKER PRO is a simple fill-in-the-blank affair. But navigating fields can be tedious.

2 Q&A allows you to select predefined entries from drop-down list boxes in its Spreadsheet View (shown) or its Form View.

3 APPROACH 3.0 adds a worksheet view so users can enter data as in a spreadsheet.

4 When you enter data in ACCESS, the program won't let you start a new record until you've provided index and primary key data for the current record.

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assistant, DAVE (do anything very easily), which provided guidance via its structured, orderly set of choices for querying. DAVE is essentially an automated help module similar to the assistants and experts in the other database packages. DAVE helped our testers pull specific records that met defined criteria, and some testers found they always needed it to get the querying job done. Others, however, felt too limited by its imposed structure.

As befits a higher-end product, Access has better tools for carefully designing queries and reports you use frequently. Queries, sorts, and search routines can all be saved. Quick ad hoc filters or sorts were a tad stickier for the testers. A separate query tool with rich capabilities to design very complex queries is available, but it did not work easily with ad hoc queries. Even the Wizards gave little assistance. Only a time-consuming read of the documentation bailed our testers out.

The Approach SmartIcons querying functions were baffling to some of the testers, who got lost trying to mine information from the databases they themselves had created. Part of the problem was uninformative graphics. Approach's modes—form, browse, and so on—confused these Windows users, who were accustomed to nonmodal programs, where almost every function is available from any screen.

Reporting for Active Duty

Seeing your data in black and white in a well-formatted design certainly helps to communicate querying results. Good products should give you formatting control so you can define the data you want to appear, how, and in what order.

Q&A's DAVE proved handy in that respect for those testers who used it, but those users who refrained frequently got lost in a maze of menus while striving to understand sorting, retrieving, and a variety of other database concepts. The testers who relied totally on DAVE found they were able to finish their tasks quickly.

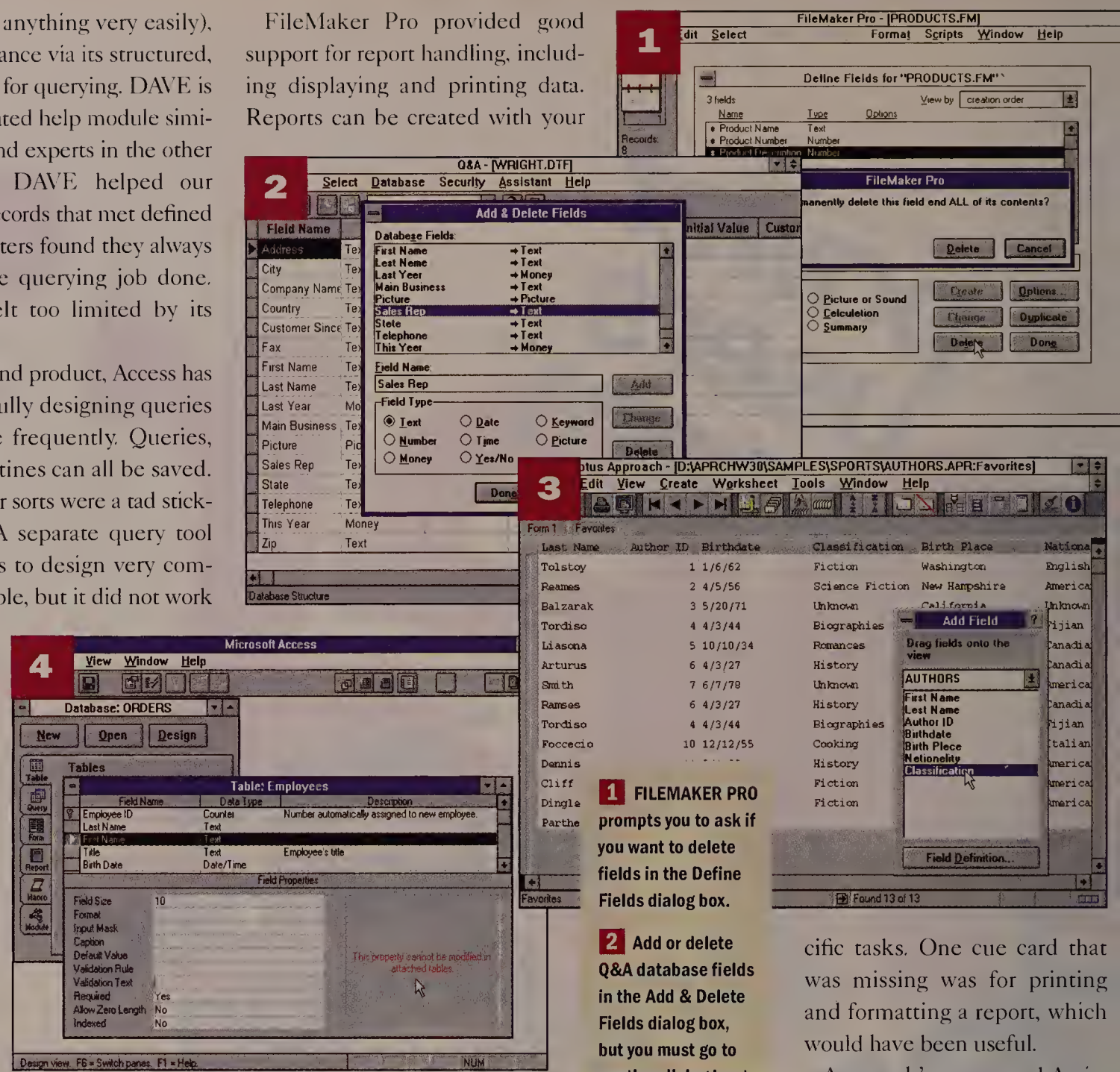
FileMaker Pro provided good support for report handling, including displaying and printing data. Reports can be created with your own custom design or with a hand-holding set of templates. The product even comes with templates that resemble style sheets in word processing packages. But the testers had trouble finding ways to create their reports—some didn't realize the template serves as a report format; others didn't find the templates at all—since they are not referred to anywhere in the main manual or online. FileMaker Pro does not include a charting capability for producing graphs in reports.

Access offers the more versatile Wizards for step-by-step design of frequently needed queries and reports. But quick ad hoc printouts proved harder to master because testers, accustomed to using the Wizards, now had to do it on their own. The package comes with online Cue Cards, a set of sequential help screens for performing specific tasks. One cue card that was missing was for printing and formatting a report, which would have been useful.

Approach's automated Assistants offer enough guidance that testers were able to print out their reports fairly quickly. However, while the Assistants allowed them to execute a simple report quickly, they also prevented the testers from learning about underlying database concepts. The effect was that the users became totally dependent on the Assistants for performing database tasks. This level of reliance meant that these users were likely to start from scratch every time they wanted to print a report.

Duty Free Importing: Access to External Files

A vital feature of a solid database package is its capability to import existing data from other sources, such as another database program, a word processor or spreadsheet file, or ASCII records. Importing can save hours of reentering information into your data-

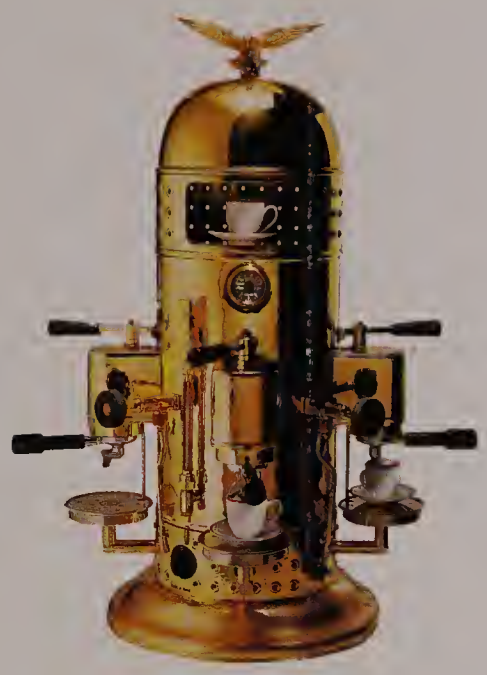


1 FILEMAKER PRO prompts you to ask if you want to delete fields in the Define Fields dialog box.

2 Add or delete Q&A database fields in the Add & Delete Fields dialog box, but you must go to another dialog box to change a field name.

3 Drag-and-drop a predefined field onto the APPROACH worksheet view of a table to add the field to your database.

4 ACCESS guards against modification to table structure and forbids changes when a form using the table is open.



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- *Secondary cache: 256KB to 512KB*
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base. All the packages included here can handily digest data from a legion of other popular (as well as unique) file formats.

FileMaker Pro recognizes even SYLK and DIF formats. Once you select a file to import, FileMaker Pro brings up the imported file's field structure and lets you select the fields you want to import. A drag-and-drop operation that indicates which imported fields are equivalent to the ones in your database makes the process easy. You can browse the imported data as it flows in, so you can better link the existing data's field names to your new database's fields.

Q&A is also a well-read database, handling formats as diverse as Paradox, Macintosh, Reflex printed files, and Excel. The mouse-driven import process is much like FileMaker Pro's, but the interface is a tad clunkier, forcing you to use the mouse for what might be literally 100 clicks on a moderately complex file.

What distinguishes Approach's import method is its capability to assimilate other file formats and read them as if they were its own. It can work directly with most other database formats including FoxPro, Access, Excel, Paradox, and dBASE. Data changes are saved in the original file format. An Import Setup dialog box lets you connect fields in the external file to your current database structure and browse the external records as clarifying examples of the fields.

Access handles a slew of file formats but has a minor stumbling block: Our testers could not find the Import command on the menus until after they closed the table. Access does have tools to let you save a frequently used conversion with formats and file name specifications.

What's It All Mean?

Two clear choices emerged from our testing. At the low end, Best Buy FileMaker Pro 2.1 was the easiest product for our testers to use. It is capable enough for many tasks, even within work groups. But it loses steam when you need more than its limited relational capability. Q&A 4.0 is a fine second here, but our testers didn't find it quite as easy to use.

In the middle to high-end range, Best Buy Access 2.0 is a solid choice. Access is harder to use than it should be but does a credible job of stretching downward from the intimidating heights of programmable relational database managers. Be prepared

FEATURES COMPARISON

Access, Approach, Paradox Cover Bases

● Yes
○ No

	Borland Paradox 5.0	BEST BUY Claris FileMaker Pro 2.1	Lotus Approach 3.0	BEST BUY Microsoft Access 2.0	Symantec Q&A 4.0 for Windows
Standard features					
List price	$495[1]	$399[2]	$495[3]	$495	$249.95
Maximum records per data file	limited by disk space	limited to 32MB	varies, more than 1 billion	limited by disk space	16 million
Number of data types	17	7	8	8	7
Relational capabilities	●	●	●	●	○
Number of tables that can be linked	unlimited	16	varies	32	1
Data entry tools					
Pattern testing	●	○	●	●	●
Rule-based verification	●	●	●	●	●
Forced uppercase	●	○	●	●	●
Automatically incrementing fields	●	●	●	●	●
Database formats imported and exported					
Comma delimited ASCII	●	●	●	●	●
Paradox	●	○	●	●	●
dBASE	●	●	●	●	●
1-2-3	●	●	●	●	●
Excel	●	○	●	●	●
User can add/delete indexes	●	○	●	●	○
Query facilities					
Query by form	○	●	●	○	●
Query by example	●	○	●	●	●
Query help tool	●	○	○	●	●
Save queries	●	●	●	●	●
Maximum sorting criteria	255	10	255	255	50
Graphing and charting tools	●	○	●	●	○
Forms					
Number of templates supplied	8[4]	7[4]	51[5]	45	7[4]
Cross-tabbed reports	●	○	●	●	○
Provides connection to SQL databases	●	○	●	●	○
Programming language	●	○	○	●	●
Service and support					
Daily toll-free phone support (hours)	11	12	11.5	12	9
Length of free tech support	none[6]	90 days	90 days	unlimited	90 days
BBS	●	○	●	●	●
Online forums	●	●	●	●	●
Fax	●	●	●	●	●
Contact	800/ 331-0877	800/ 325-2747	800/ 343-5414	800/ 426-9400	800/ 441-7234
Reader service number	844	845	846	847	848

[1] Introductory competitive upgrade $200.
[2] Introductory price of $129.
[3] $129 through 12/31/94.
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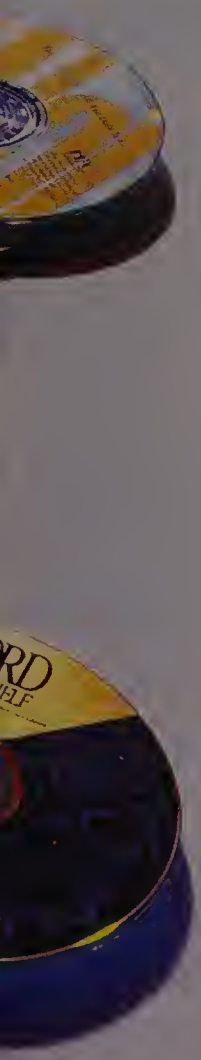

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to struggle in the course of learning the product and getting used to all of its idiosyncrasies. Approach 3.0 is our second choice here. It has a wide array of interesting and innovative features, and naturally, it appeals especially to 1-2-3 and Notes users because of its near-seamless integration with these Lotus products. Nevertheless, when Lotus added more power, features, and depth, Approach unfortunately lost some of its straightforwardness and clarity.

We did not see the final version of Paradox 5.0, but Paradox is obviously far too complex a product to consider unless you really need its power and are willing to invest in its long learning curve. In its final version, Paradox will likely be a contender at the high end, too, especially since most of its enhancements are designed more for the programmer and the developer than the end user.

Be warned, however, that choosing a database for complex application development can be risky. Make sure the package has all the functionality, power, and speed that you need. The only suitable products in this review are Paradox, Access, and possibly Approach. Paradox and Access in particular have the right programming power and tools for these tough projects. And make sure you can do any needed programming. Often the skills of available programmers or company software standards will limit your choice.

With any database package, the same advice applies: Extra time and money spent up front to make sure the program can handle your project will save you in the long run. And if you need help, get it. Databases are complex, often unfriendly beasts, and despite vendors' claims to have tamed them, a vicious bite may await you.

Jeff Angus is a management and computer consultant based in Seattle. Michael S. Lasky is an associate editor and Owen Linderholm a senior editor for PC World.

For more information about all products in this article, circle reader service no. 909.

TASK COMPARISON: BASIC

FileMaker, Q&A Are Simplest

BASIC TASKS	Borland Paradox 5.0[1]	BEST BUY Claris FileMaker Pro 2.1	Lotus Approach 3.0	BEST BUY Microsoft Access 2.0	Symantec Q&A 4.0
Interface/tutorial					
Logical menus	2	4	2	3	3
Mouse controls	4	5	4	3	4
Keyboard controls	4	3	3	3	3
Documentation	2	3	2	2	3
Tutorial	4	3	3	4	4
Online help	3	3	3	4	3
Icon/button clarity	2	4	3	2	3
Menu customization	4	2	3	4	[2]
Database design					
Concept and planning	2	3	3	2	2
Templates	1	3	3	3	1
Design help/assistant	3	[2]	2	3	2
Drag-and-drop editing	4	4	4	3	[2]
Creating scripts/macros	[2]	3	3	3	3
Data entry					
Data verification	5	4	4	5	4
Data import	4	3	5	3	4
Variety of data types	5	3	3	3	3
Altering an existing database					
Editing data	3	4	4	4	3
Editing scripts/macros	[2]	3	3	4	4
Editing forms	3	5	4	3	4
Creating and executing a query					
Ad hoc/quick	2	4	3	3	5
Reusability	5	3	3	5	5
Creating and executing a report					
Ad hoc/quick	2	3	4	3	5
Reusability	5	3	4	4	5
Managing forms					
Creating	3	5	5	3	3
Using	5	4	4	4	3
Overall rating: basic	3.1	3.5	3.4	3.4	3.5

5 4 3 2 1
Best ← → Worst

These scores rate each product's features for performance and functionality on a scale of 1 to 5.

[1]Beta version.
[2]Feature not available, value = 0.

TASK COMPARISON: ADVANCED

Paradox, Access Have Power

ADVANCED TASKS	Borland Paradox 5.0[1]	BEST BUY Claris FileMaker Pro 2.1	Lotus Approach 3.0	BEST BUY Microsoft Access 2.0	Symantec Q&A 4.0
Data analysis					
Graphs	4	[2]	4	3	[2]
Cross-tabulations	4	[2]	4	4	1
Support for relational features	5	1	4	4	1
Programming language					
Feature set, power	5	[2]	[2]	4	2
Clarity, ease of use	4	[2]	[2]	3	2
Networking and cross-platform functions					
Shares documents between versions in different operating environments	[2]	2	[2]	[2]	2
Database linking	5	2	4	4	2
DDE/OLE support	4	2	4	5	2
Data integrity and file- and record-locking	5	3	4	5	3
Data security	4	4	4	3	3
SQL access and connections	4	[2]	4	4	[2]
Overall rating: advanced	4.0	1.3	2.9	3.5	1.6

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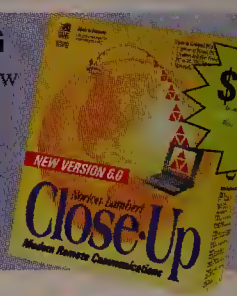

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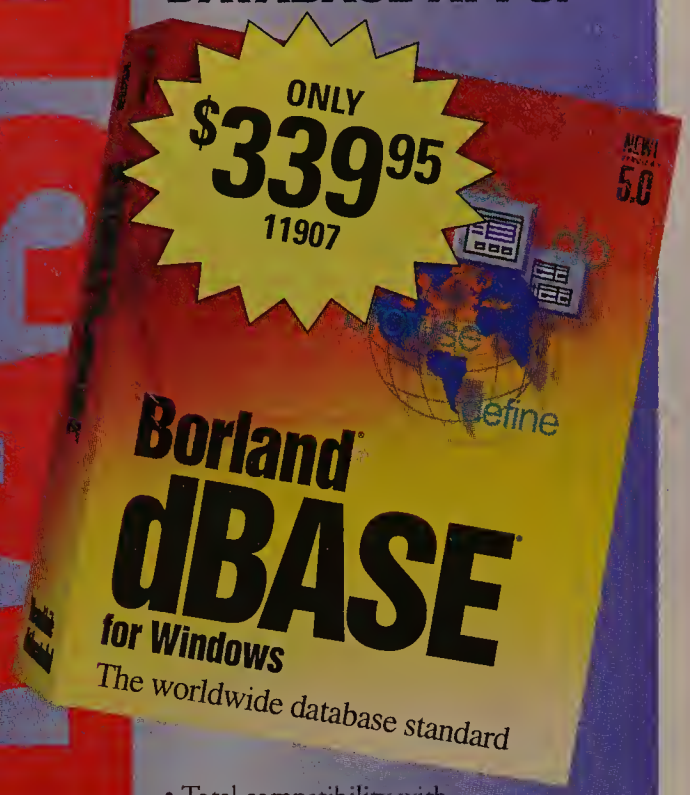

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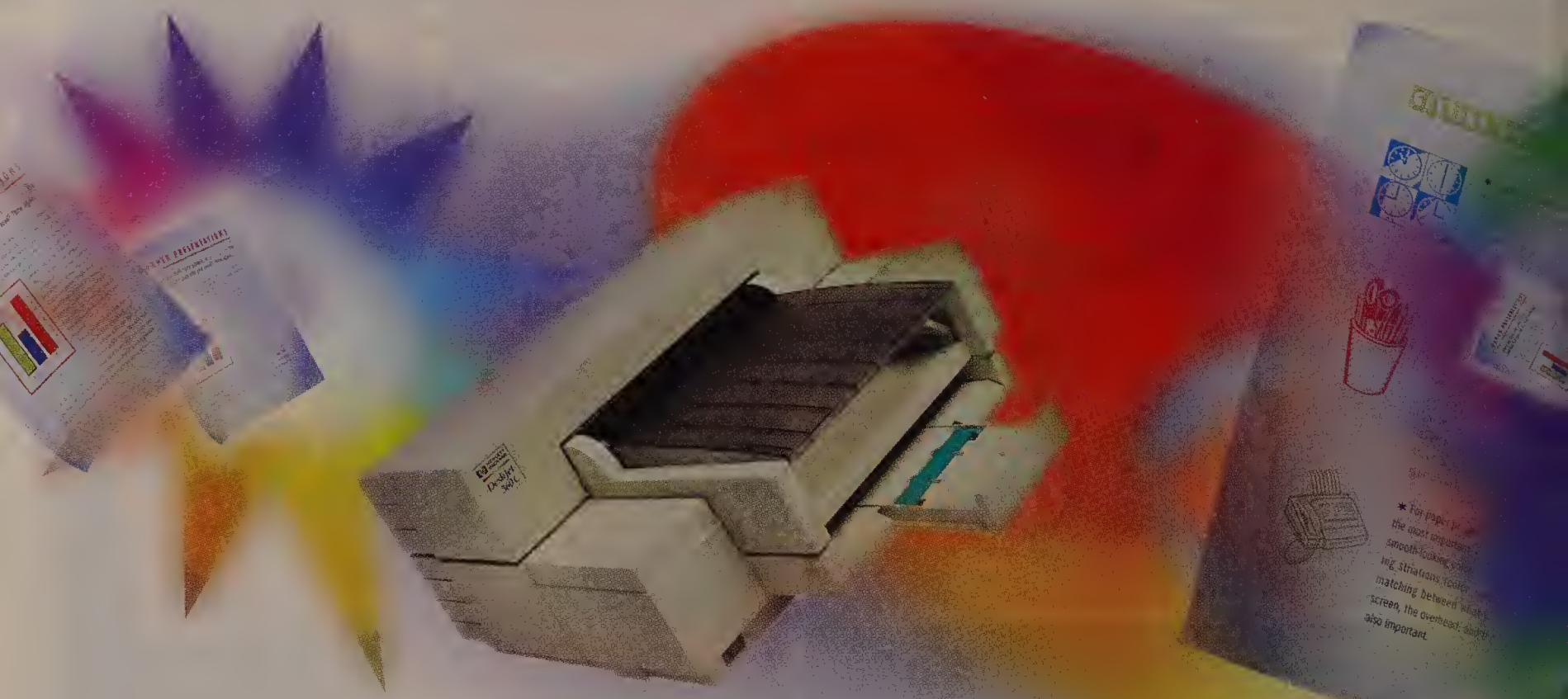


High Color,

Rainbow-hued charts and graphs, presentations, and transparencies come to the desktop with the new generation of affordable color printers. We review nine models priced from $300 to $1400.

When you think color printers, is money-green the first hue that pops into your head? Think again. With street prices free-falling to below $400, low-cost color printers are among the hottest-selling peripherals. By most estimates, they will outsell monochrome printers by 1996. "What people are buying," says Bill Flynn, an analyst at BIS Strategic Decisions, "is an affordable utility printer, priced so that color is almost coming along for the ride."

But even given prices low enough to encourage impulse buying, business buyers should consider the cost of *using* a color printer. Once that new bargain printer spits out its last colorful sheet, how much will you have to pay to keep it printing? Paper and color ink sup-

Low Cost

By Michael Goodwin and Bob Weibel

plies add up. So the real question is, do you *need* color? And if you do, will one of these low-price models do the job? To help answer both questions, we took a hard look at nine color printers, street-priced at $1400 and below, that are riding the crest of this rainbow wave.

These low-end printers lack a lot of the feature comforts you'll find in $2000-plus color printers, such as better paper handling, PostScript processing, and network connectivity—not to mention excellent output. But if you don't mind the longer wait, some of them offer color output that's almost as good as that of higher-end machines. For practical purposes, printing readable black text is what makes these dual-purpose printers so useful. Supplies also cost less. Sure, you'll get optimal results by using special paper that prevents bleeding, but the faster-drying inks used in many of these low-end models can give excellent results on dirt-cheap laser paper. Try *that* on a higher-end model.

We looked at five low-end color ink jets priced from $300 for Hewlett-Packard's DeskJet 310 (300 dots per inch) to $1400 for HP's DeskJet 1200C (600 by 300 dpi in black, 300 dpi in color).

We also checked out Fargo's 203-dpi Primera Color Printer in two incarnations: First we used it as a $700 thermal wax printer (which heats a waxed ribbon to melt tiny points of color onto paper), and then, for only $215 more, we upgraded it to dye-sublimation mode for the

GILES HANCOCK

kind of photo-realistic output you'd expect from a $5000 printer. Fargo cut costs drastically by designing the Primera without a processor, so this "dumb" printer uses your PC's CPU to muscle through print jobs. Unfortunately, the Primera may slow down busy PC workloads while printing big jobs. You also need pricey special ribbons and media for optimal results. If you don't mind paying at least $2.80 a page, you can crank out continuous-tone images that look like photos.

Finally, we tested two heat fusion printers, the $330 portable Citizen Notebook II (360 dpi) and the $500 Star Micronics SJ-144 (360 dpi). Both use narrow dye-coated ribbons that are melted onto the paper, where they dry as solid dots. These printers do a fine job of printing simple spot colors, but in our tests large colored areas were banded because of the narrow ribbons.

Choosing the Right Color

Before choosing a color printer at any price, you need to ask yourself what you'll be using it for. A recent *PC World* survey shows that 85 percent of the time, most people using color printers print plain black text.

With close to 3 million of these low-end units moving into large companies (those employing more than 20 people), small companies (fewer than 20 employees), and even home offices, people are using color to distinguish themselves in the following ways.

Best Buys

Don't let the high price fool you: HP's DeskJet 1200C is the best value here, printing high-quality color pages faster and cheaper than the rest. For about $800 less, Canon's BJC-600 and HP's 560C also earn Best Buys, offering fine print quality for small or home offices. The BJC-600 isn't as fast as the 560C, but it's cheaper in the long run.

Speed, quality color, and low printing costs win Hewlett-Packard Best Buys for the 1200C and 560C printers. Canon's BJC-600 also gets top honors.

Paper Presentations

This is one of the most important categories of color print jobs at large companies. While overhead transparencies are generally produced on faster, higher-quality printers, paper printouts are usually passed around at meetings or used as proofs for projection slides.

For paper presentations, output quality is the most important consideration. You'll want accurate colors that look smooth and are free of distracting striations (color banding). But you don't need to split hairs over the quality of the small text, since presentations generally avoid blocks of text in favor of headline-size type.

Speed is also vital, since a 30-minute presentation is likely to entail at least 15 prints. Moreover, color backgrounds require a high percentage of color coverage, which means slower printing. If your printer takes 5 minutes to grind out a page, that 15-slide presentation could take well over an hour to print.

And most of the printers we tested weren't *nearly* that fast. True, our two-page presentation was a challenging (yet typical) color document: 80 to 90 percent color coverage with gradient background fills, rotated text, and several clip art elements. One gradient fill was a orange sunset fading to black—a color-matching nightmare. Incredibly, printing this document took anywhere from about 3 to 30 minutes per page.

With that in mind, we found HP's DeskJet 1200C the best low-end machine for printing paper presentations in a large-company environment (see "Studying the Fine Print"). For starters, the 1200C delivered each presentation page in less than 3 minutes—hardly breathtaking, but we're talking accurate, full-color coverage. All colors were well saturated, even on inexpensive laser paper. The 1200C's built-in black-ink cartridge provides "true" blacks for discrete objects and text. In addition, the 1200C can print pure black next to (or on top of) color graphics, thanks to its four separate color printheads. And this is the only ink jet that won't soak the paper with ink (and consequently wrinkle it).

Pick the Printer for Your Needs

Looking for the perfect printer to match your needs? Here's what we recommend.

	LARGE BUSINESS	SMALL BUSINESS	HOME OFFICE
Paper presentations	HP DeskJet 1200C	HP DeskJet 560C	HP DeskJet 560C
Overhead transparencies	service bureau	service bureau	service bureau
Charts and graphs	HP DeskJet 1200C	HP DeskJet 1200C	HP DeskJet 560C
Fliers and brochures	service bureau	HP DeskJet 1200C	Canon BJC-600
Proofing copy	HP DeskJet 1200C	Canon BJC-600	Canon BJC-600
All-purpose printing	higher-end printer	HP DeskJet 560C	HP DeskJet 560C
Digital photos	higher-end printer	Fargo Primera/Canon BJC-600	Fargo Primera/Canon BJC-600

Our runner-up for paper presentations is HP's DeskJet 560C (600 by 300 dpi in black, and 300 dpi in color). At $570, it's easily within the budget of a small business's sales team—and it's more than $800 cheaper than its older sibling, the 1200C. With a print speed of less than 8 minutes per page, the 560C places in the middle of the pack for speed, but its output quality is excellent, with good color-matching and smooth gradient fills. Unlike the 1200C, it sports a three-color cartridge and a dedicated black-ink cartridge for printing distinct, pure black objects. Unfortunately, the 560C's printer driver can't detect specific black portions of complex color graphics, so it uses the color cartridge instead for composite-black printing (black created from a mix of cyan, magenta, and yellow ink). Thus, the black portions of the blue-to-black color gradient looked a little bit greenish.

Overhead Transparencies

Wowing an audience with color can backfire if your overhead isn't a perfect print. Any flaw—especially a colorful one—can distract attention. Slightly jagged text and fuzzy graphics are exaggerated when projected onto the canvas. It's no surprise that larger companies invest in more expensive printers than the models we reviewed. Sure, some small businesses may find HP's 1200C just fine for informal presentations, and home office users who need an occasional presentation overhead will get fair results with HP's 560C. But the 560C's biggest rival, Canon's $590 BJC-600 (360 dpi), produced noticeable banding over large color segments—a definite no-no for any presentation. And both versions of Fargo's Primera offer smooth, good-looking graphics for paper as well as for overhead presentations, but you'll want to keep text to a minimum to avoid excessive jaggies. Keep in mind that all these printers use specially coated transparency media, priced around a dollar a page. All in all, we can't recommend any of these low-end printers for producing pristine overheads.

Charts and Graphs

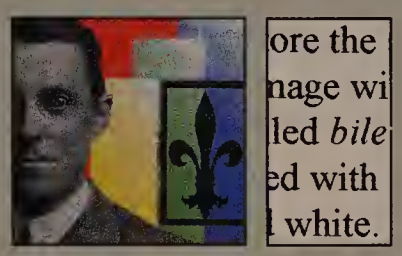
Large companies often use low-end color printers to produce internal reports that combine business charts and graphs with a fair amount of text. As with presentations, output quality is paramount: Color coverage should be smooth and free from glaring color mismatches. But unlike presentation slides, with charts and graphs the quality of fine print is also important.

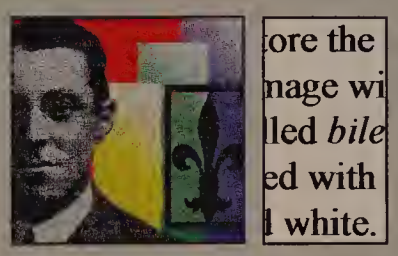
Smaller businesses looking for ways to distinguish themselves from the little fish—so they, too, can become big fish—should consider a low-end color printer to promote a big-company image on a start-up budget. However, even a small business that can afford to buy a color printer will probably be far more sensitive to ink and paper costs than a larger operation will be. So lower operating expenses will usually outweigh small differences in quality. Speed is generally less important, too, unless this is the only printer in the company.

If you need slick color charts and graphs, HP's 1200C is once again our top pick. In addition to providing fine color coverage, it prints crisp text and sharp graphics, delivering 600-by-300-dpi resolution in black and 300 dpi in color. The 1200C's newly designed cartridge printheads sport 104 nozzles each (compared with the 50-nozzle cartridges of the 560C and the 64-nozzle printheads of

Studying the Fine Print

Expect compromises on graphics when eyeing low-end color printers. A rule of thumb: Study italic text to judge text quality; for graphics, look at color accuracy and smooth halftone patterns. The photo-realistic version of the Fargo Primera prints stunning graphics, but jaggy text and expensive paper are hard realities. On plain paper, HP's 1200C is the next best bet, with detailed images and razor-sharp text. HP's 560C and 310 and Canon's BJC-600 are cheap alternatives for making pristine prints.


Canon BJC-600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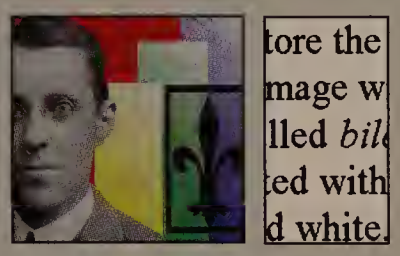
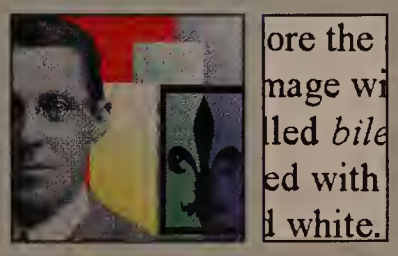
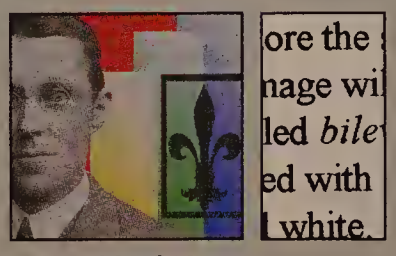
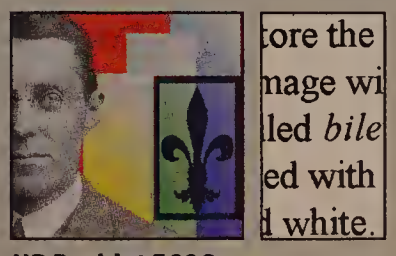

Fargo Primera (photo-realistic)


Fargo Primera (thermal wax)


HP DeskJet 310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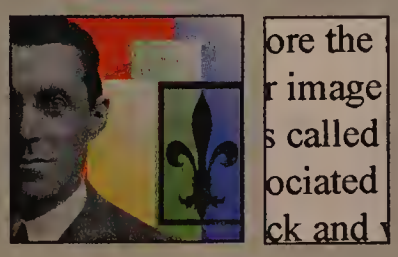
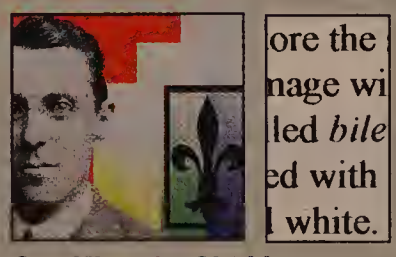
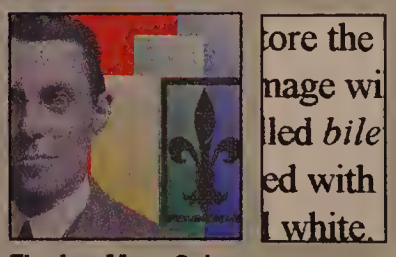

HP DeskJet 1200C


Star Micronics SJ-144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the Canon BJC-600). Combined with reformulated inks, HP's new printheads create exceptionally small dots that reduce ink spreading and paper wetting while cutting ink consumption. Their black-ink cartridge is the first on the market to use pigment-based ink, which makes black text look blacker and crisper.

If your business can't afford the 1200C, consider HP's 560C, our second choice for printing charts and graphs. It does particularly well with black rules and text, thanks to its ability to switch automatically between the black- and color-ink cartridges, its 600-by-300-dpi resolution on blacks, and its built-in resolution enhancement. Our only complaint: Now and then, the 560C let black lines bleed into color areas, but adjusting the printer's color registration solved the problem.

Fliers and Brochures

Small companies usually use color printers for grinding out announcements, fliers, brochures, menus, short-run newsletters, and so on—all jobs that incorporate body text, display text, and spot-color elements such as clip art. And unlike large companies (which may have at least a few dedicated monochrome printers for simple black text), some small businesses use color printers for monochrome printing as well. To handle such jobs, you need a printer that delivers good spot color plus crisp text that looks good even when printed over graphic elements.

Once again the 1200C sweeps up our top honors. Its good-looking output is perfect for demanding print jobs, and it's the swiftest printer we tested. Best of all, while it's the most expensive, the 1200C's per-page operating expenses are the lowest in our roundup (see "Counting on Color"). The 1200C uses less ink, and its high-capacity cartridges yield good results on inexpensive paper.

Canon's 360-dpi BJC-600 earns the runner-up slot. Like the 1200C, the Canon's printheads spray four separate colors, one of which is black—which enables it to print true-black text next to, or right on top of, colored graphics. And the BJC-600 was a bit faster than the 560C on our brochure and flier tests. Moreover, Canon's cartridges are a bargain: Each color is $8, compared with up to $35 for other printers that use cartridges.

The Canon comes with a few trade-offs, however. For one thing, its print driver is poky, taking twice as long as the 560C to dump a document into Print Manager. Nor can you control the Canon's ink density to optimize ink use with special media such as Micro Format's Super Color ink jet paper (800/333-0549), which gives you the same print quality with less ink. But the Canon's 360-dpi graphics resolution, low operating cost, and high output quality outweigh these annoyances.

Proofing Copy

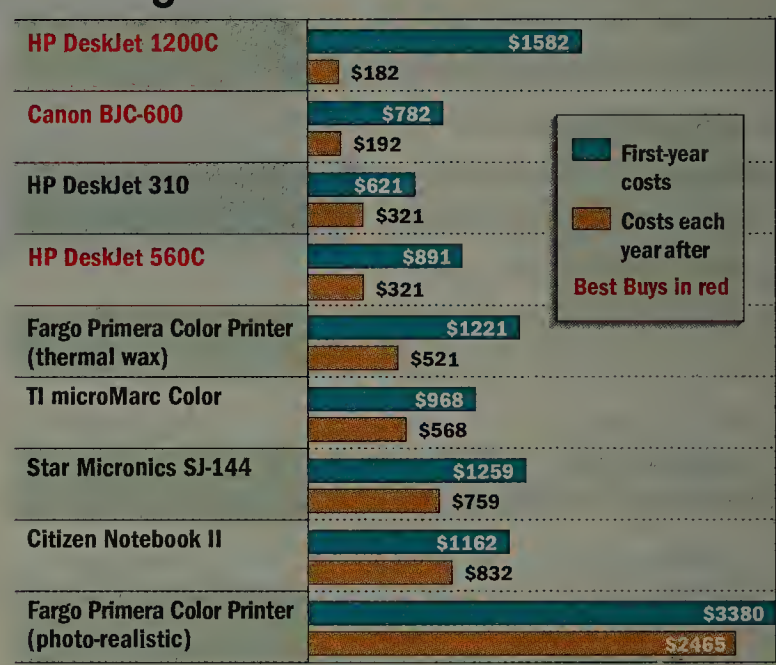
Many large companies do color printing in design departments equipped with the latest (and most expensive) printers and copiers. But individual work groups may find low-end color printers a cheap way to review designs and catch mistakes in-house, before they are published. And if the high-end production printer is booked or down for repairs, knocking out a few less-fancy color pages on the cheaper unit is a time-saving alternative.

Color Costs

Color printers look tempting at today's low prices, but how inexpensive are they when you consider all the costs? The top bar for each printer shows the first-year costs of purchasing and using each color printer we tested. The bottom bar in each row adds up the same per-year operating costs but excludes the initial printer purchase. Adding both bars together provides a good estimate of long-term color costs for each printer. We're assuming a print load of 40 pages a week and that 85 percent of the pages are black text (5 percent ink coverage) and 15 percent are color (50 percent ink coverage). We also assume 70 percent of the pages are penny-a-sheet plain paper, 25 percent are coated stock, and 5 percent are high-end glossy paper or transparencies.

Ink jet ink costs are based on comparative page-yield analyses provided by Charles LeCompte, editor of *The Hard Copy Observer*. Other ink and ribbon costs were gathered from vendor data or our internal tests. All costs are based on vendors' list prices. You can find discounts of 20 to 30 percent on inks and media for big-selling brands like Hewlett-Packard, but not necessarily for all models.

Counting on Color



Unfortunately, most low-end color printers are not well suited for network use. Aside from being slow, their monthly duty cycles are too low to satisfy even a small work group. HP's DeskJet 1200C is an exception. Not only is it reasonably fast, but it boasts a variety of optional network interfaces. Nevertheless, most large companies are probably reluctant to put color printers on the net, since unlimited network access to a color printer can quickly put a budget in the red.

Smaller companies also use inexpensive color printers to check the accuracy of desktop publishing projects. Printing requirements for proofing are similar to those for brochures and fliers—good spot color and crisp text—only a bit more rigorous.

It's no surprise that the HP DeskJet 1200C again takes the gold, while Canon's BJC-600 beat out HP's 560C for the silver. For

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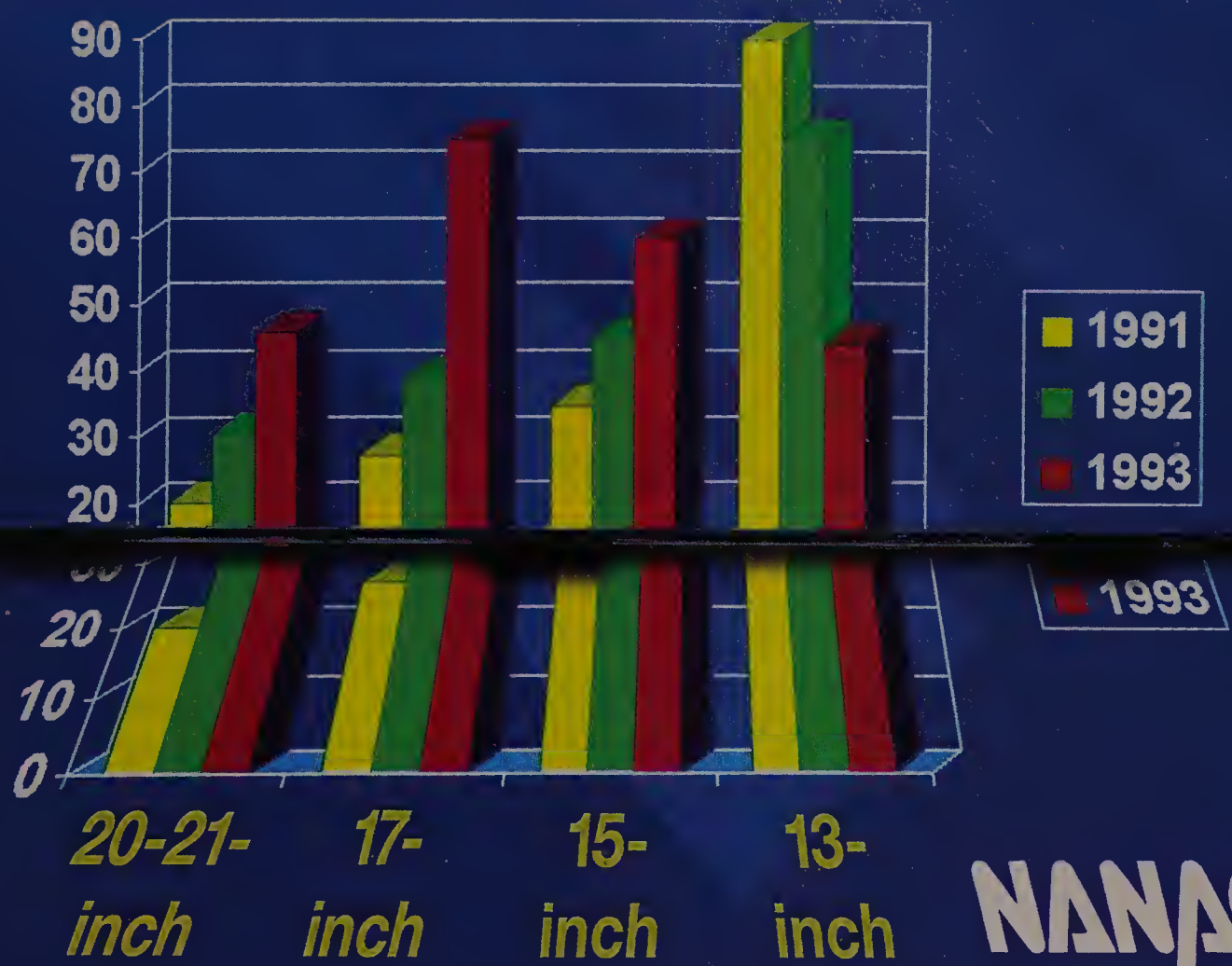

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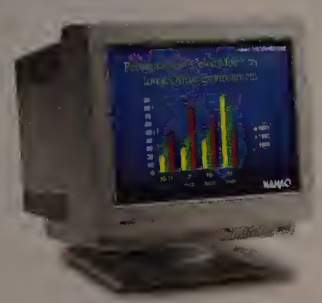

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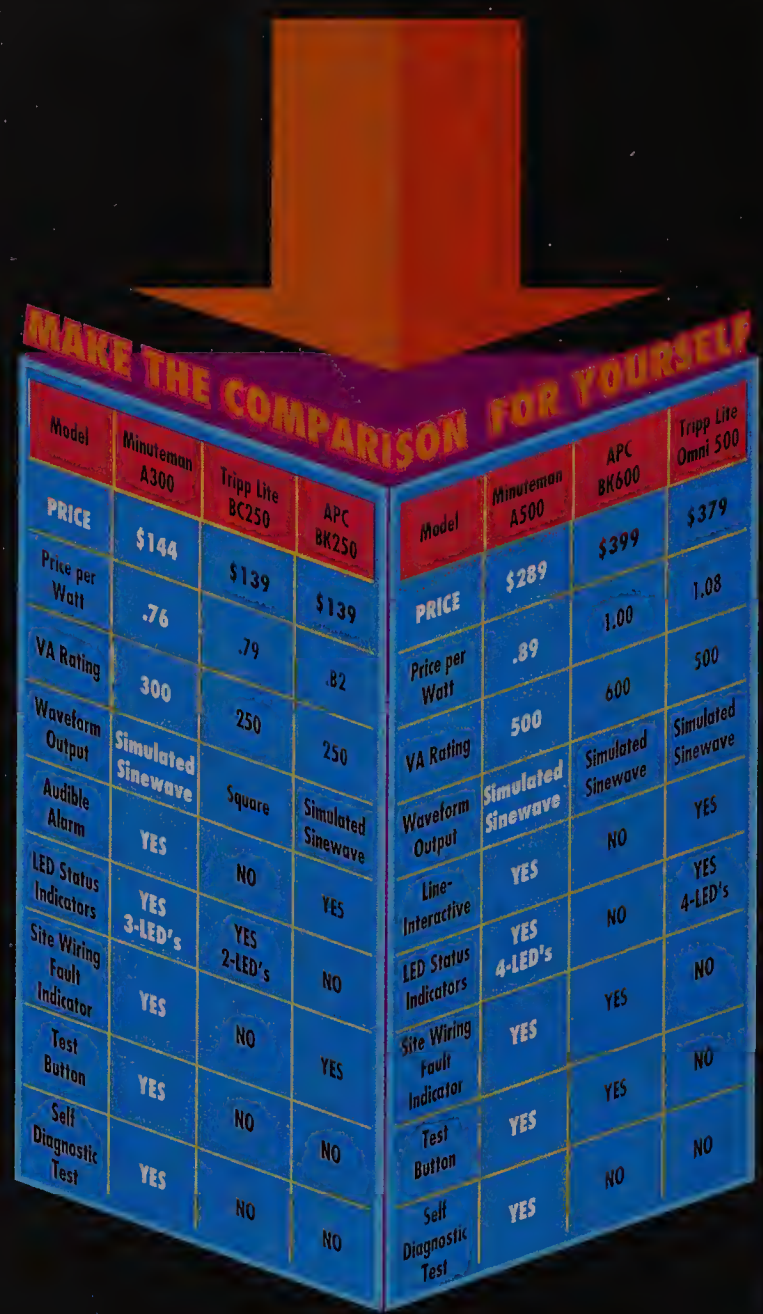

Model	Minuteman A300	Tripp Lite BC250	APC BK250
PRICE	$144	$139	$139
Price per Watt	.76	.79	.82
VA Rating	300	250	250
Waveform Output	Simulated Sinewave	Square	Simulated Sinewave
Audible Alarm	YES	NO	YES
LED Status Indicators	YES 3-LED's	YES 2-LED's	NO
Site Wiring Fault Indicator	YES	NO	YES
Test Button	YES	NO	NO
Self Diagnostic Test	YES	NO	NO

Model	Minuteman A500	APC BK600	Tripp Lite Omni 500
PRICE	$289	$399	$379
Price per Watt	.89	1.00	1.08
VA Rating	500	600	500
Waveform Output	Simulated Sinewave	Simulated Sinewave	Simulated Sinewave
Line-Interactive	YES	NO	YES
LED Status Indicators	YES 4-LED's	NO	YES 4-LED's
Site Wiring Fault Indicator	YES	YES	NO
Test Button	YES	YES	NO
Self Diagnostic Test	YES	NO	NO

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- Powermind series line-interactive, intelligent UPSs from 600VA to 2KVA
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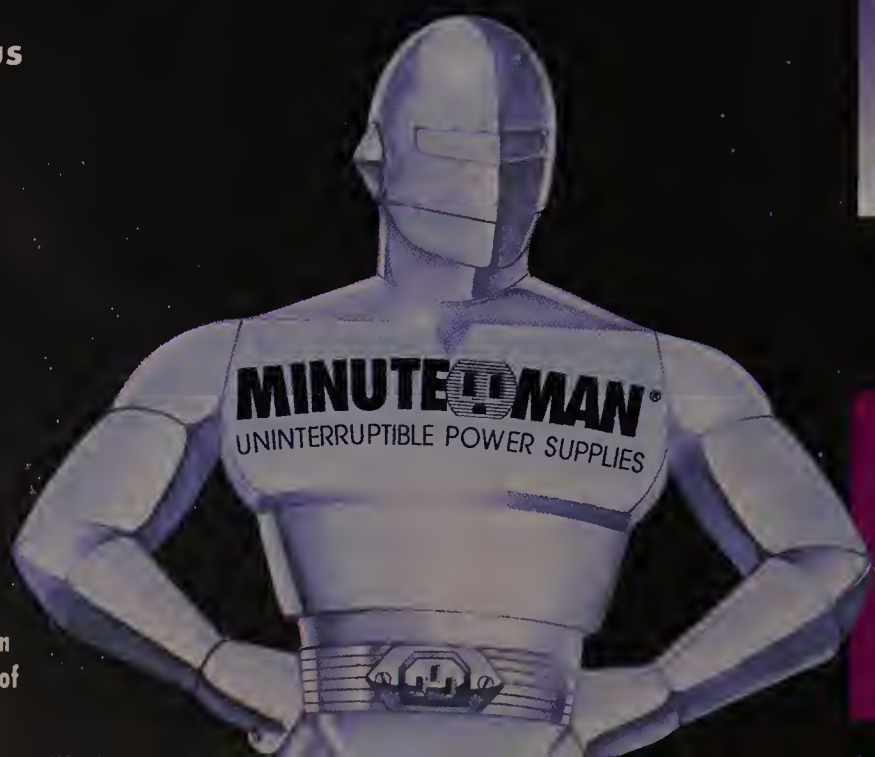
- Lanmaster bi-directional power monitoring and shutdown software
- SNMP compatible



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Fax: 214/446-9011

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Circle 165 on reader service card

PC WORLD READER SURVEY

Win an HP LaserJet 4P

Where do you use computers? (Mark all that apply.)
- ◯ Work
- ◯ Traveling
- ◯ Don't use
- ◯ Home
- ◯ Elsewhere

In which industry do you work?
- ◯ Health care
- ◯ Private industry/business
- ◯ Education
- ◯ Not working
- ◯ Government

How many employees work for your company or organization?

Employees...	At your work site	At all plants/ branches/offices
1–49	◯	◯
50–99	◯	◯
100–1000	◯	◯
More than 1000	◯	◯

What are your management responsibilities?
- ◯ Business owner, president, or general manager
- ◯ Senior manager, division head, or CIO
- ◯ Department or work-group manager
- ◯ Other supervisor or manager
- ◯ No management responsibilities

Do you work in an MIS/IS, networking, or other computer-related department or job?
- ◯ Yes
- ◯ No

Which categories describe your primary job functions?
- ◯ Data processing/MIS
- ◯ Systems/programming
- ◯ Microcomputer management
- ◯ Communications/networks
- ◯ Engineering
- ◯ Research/development/scientific
- ◯ Computer consulting
- ◯ Other computer function
- ◯ Drafting/design
- ◯ Human resources
- ◯ General management
- ◯ Accounting/finance
- ◯ Purchasing
- ◯ Operations
- ◯ Sales/marketing
- ◯ Education/training
- ◯ Professional services
- ◯ Manufacturing/production
- ◯ Other

Which products are installed at your work site, and which will you personally be involved in buying for yourself or others, anywhere in your organization, during the next 12 months?

	Installed at work site	Buy in next 12 months
Hardware		
Pentium PCs	◯	◯
486 PCs	◯	◯
PowerPC systems	◯	◯
Multimedia-equipped PCs	◯	◯
Notebook/subnotebook PCs	◯	◯
Workstations	◯	◯
Local area networks (LANs)	◯	◯
Network servers	◯	◯
Network hardware (cards, hubs, cables, and so on)	◯	◯
Operating Systems		
Windows 4.0 (Chicago)	◯	◯
Windows NT	◯	◯
Other Windows	◯	◯
OS/2	◯	◯
UNIX	◯	◯
Novell NetWare	◯	◯
Other network operating systems	◯	◯
Application Software		
Application suites	◯	◯
Word processors	◯	◯
Spreadsheets	◯	◯
Databases	◯	◯
Presentation graphics	◯	◯
Desktop publishing	◯	◯
Electronic mail	◯	◯
Communications	◯	◯
Accounting	◯	◯
Programming/tools	◯	◯
CAD/CAM	◯	◯

How are you involved, formally or informally, in PC product buying for yourself or others in your company or organization?
- ◯ Suggest products/brands
- ◯ Determine need for product
- ◯ Determine capabilities/features needed
- ◯ Evaluate brands/models
- ◯ Recommend brands/models
- ◯ Recommend/select where to buy
- ◯ Authorize/approve purchases
- ◯ Make purchases
- ◯ Not involved in any way

How is your *home* PC used? (Mark all that apply.)
- ◯ Personal finance
- ◯ Games/entertainment
- ◯ Information/reference
- ◯ Education
- ◯ Correspondence
- ◯ Connect to online services
- ◯ Work
- ◯ Other
- ◯ No PC at home

Do you have children under age 21 living at home?
- ◯ Yes
- ◯ No

If yes, please indicate the age groups of your children. (Mark all that apply.)
- ◯ 0–2 years
- ◯ 3–5 years
- ◯ 6–10 years
- ◯ 11–14 years
- ◯ 15–18 years
- ◯ 19–21 years

Two chances to win! For taking a moment to fill out our *PC World* Reader Survey, you will be entered in a drawing for an HP LaserJet 4P printer. Plus, when you fill out our Reliability and Service Monitor on the reverse side of this card, you will be entered in a second drawing, for a Dell Dimension XPS P90.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to *PC World* Fax Survey, Box 77435, San Francisco, CA 94107-0435. Send your survey in no later than October 31.

HOW TO FILL OUT THE FORM: When filling in address information, use block capital letters. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

PLEASE COMPLETE RELIABILITY AND SERVICE MONITOR ON REVERSE FOR A SECOND CHANCE TO WIN!

Please indicate your address below.

_____

_____

_____

_____

Is this address:
- ◯ Business
- ◯ Home

PLEASE FAX TO 415/974-7367

RELIABILITY AND SERVICE MONITOR

Win a Dell XPS P90

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a Dell Dimension XPS P90, a Best Buy Pentium-90 featured in this month's PC World Top 20.

HOW TO ENTER: Fax your completed questionnaire to *PC World* at 415/974-7367. If you have trouble connecting to this number, fax your survey to 415/974-7404 or 415/442-1891. Do NOT fax a cover page. If you don't have a fax machine, you can mail your survey to Fax Survey, Box 10-SS, *PC World,* 501 Second St. #600, San Francisco, CA 94107-1496. Send your survey in no later than October 31.

HOW TO FILL OUT THE FORM: Clearly print your name (use block capital letters) and your fax number at right; fill the appropriate circle for each digit of your daytime phone number. Then fill out the rest of the questionnaire. WHEN FILLING THE CIRCLES, AVOID GOING OUTSIDE THE LINES! One entry per person per month. Void where prohibited by law.

1160551

LAST, FIRST NAME

FAX NUMBER

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○	○	○

ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Ambra ○ Apple ○ Ares (MI) ○ AST ○ AT&T (NCR) ○ Austin ○ Blackship ○ Canon ○ Compaq ○ CompuAdd ○ Compudyne ○ Comtrade ○ Cornell ○ DEC ○ Dell ○ Diamond ○ DTK ○ Eltech ○ Epson ○ Everex ○ Gateway 2000 ○ Hewlett-Packard ○ Hyundai ○ IBM ○ Insight ○ Leading Edge ○ Micro Express ○ Micron ○ Mitac ○ NEC ○ Northgate ○ Packard Bell ○ Panasonic ○ Pionex ○ Polywell ○ Quantex ○ Samsung ○ Sharp ○ Swan ○ Tandy ○ Tangent ○ Texas Instruments ○ Toshiba ○ Tri-Star ○ Twinhead ○ USA Flex ○ VTech (Expotech, Laser) ○ Zenith (ZDS) ○ Zeos ○ Other

Is this PC a...?
○ Desktop
○ Notebook/laptop
○ Hand-held

Is the CPU a...?
○ PowerPC
○ Pentium
○ 80486
○ 80386
○ Other

Where did you buy this PC?
○ Local dealer
○ Mail/phone order
○ Direct from field sales force
○ Membership discount store
○ Computer superstore
○ Home electronics store
○ Retail store
○ VAR
○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week
○ 1–2 weeks
○ 3–4 weeks
○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR
○ Department/company computer technician
○ Self
○ Co-worker

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec ○ 89 ○ 90 ○ 91 ○ 92 ○ 93 ○ 94

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did you have any component problems after adding your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec ○ 89 ○ 90 ○ 91 ○ 92 ○ 93 ○ 94

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Please use this section to describe the service and support you received for the problem reported above. If you repaired the computer yourself, please skip this section.

Who fixed your PC?
○ Manufacturer
○ Dealer/store where purchased
○ Manufacturer's authorized repair technician
○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On-site ○ In-store help ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 min. ○ 15 min.–1 hr. ○ 2–5 hr. ○ 6–10 hr. ○ 11–24 hr. ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 1½–4 weeks ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

Please rate the person(s) who helped you on the following (on a scale of 1 to 5):

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ 1 Not at all ○ 2 ○ 3 Satisfied ○ 4 ○ 5 Extremely satisfied

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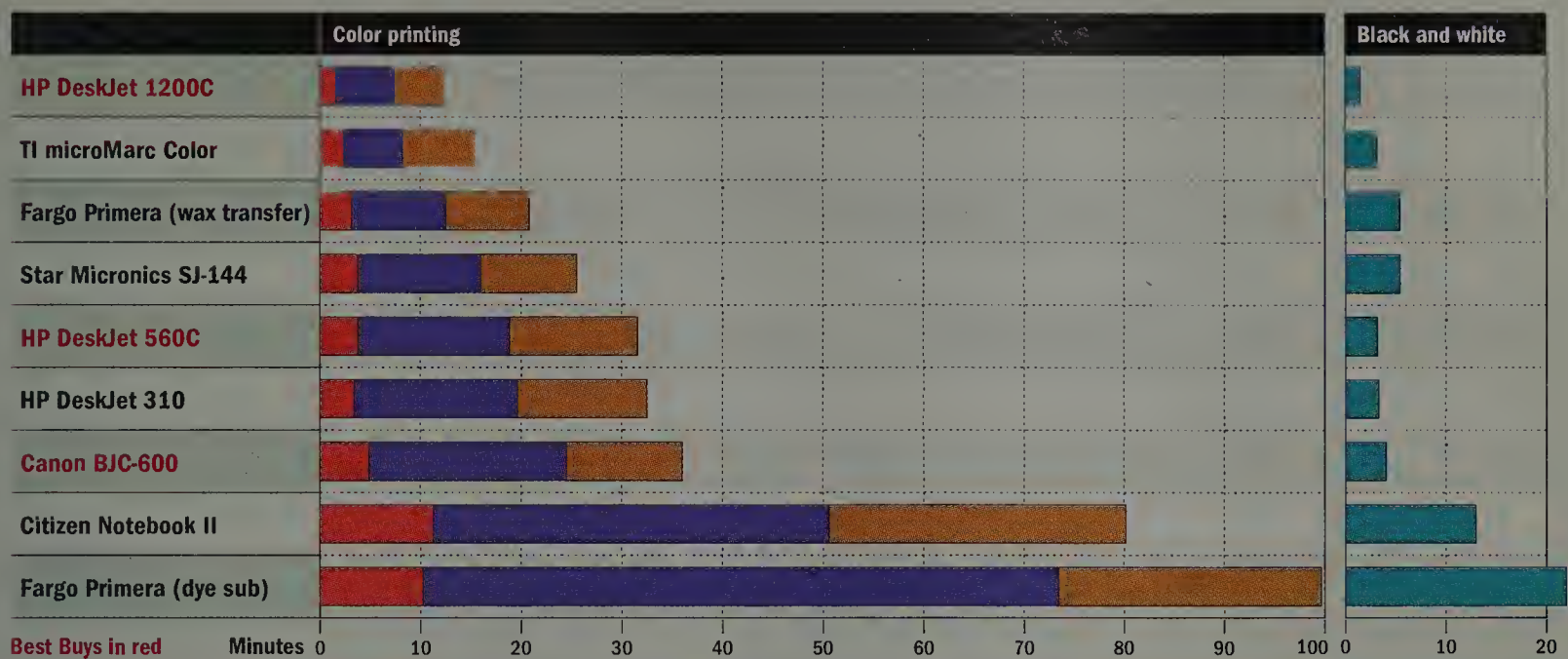
TEST REPORT

Slow Down: Color Printing Ahead



Methodology
We printed documents on plain paper using "normal" print-quality settings (generally the next-best quality option above "draft"). Times are measured from the time we pushed the print button to the time the page ejected from the printer. Each test was run twice—the first right after the printer was turned on, and the second directly after. The scores were then averaged.

Excel 5.0
We used a single-page sales report containing a small table, a 3-D bar chart, and a large paragraph of 12-point text. A logo with a gradient fill was dropped in via object linking and embedding from CorelDraw 3.0.

Freelance 1.0 for Windows
Using a two-page, landscape-oriented presentation, we tested both paper and transparency output. Both pages contained gradient-filled backgrounds and rules, clip art, bullets, and rotated text.

PageMaker 5.0 for Windows
To test proofing of complex layouts, we used a two-page document containing a color headline, a subhead, a drop cap, clip art in CGM and WMF formats, and two 24-bit TIFF images (one in color and one in black and white). Text was laid over some color areas and also wrapped around graphics.

Word 6.0 for Windows
We used a five-page technical report to test the quality of black text.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

example, our test document contained a gray-scale image next to a color image. The 560C's not-so-smart ColorSmart driver decided to use its color cartridge to print both—producing a gray-scale image with a distracting color cast. The BJC-600's four separate color printheads produced a sharp gray-scale image, and its 360-dpi resolution outclassed the 560C's 300 dpi. Our only complaint about the BJC-600 was that it couldn't print a color drop cap in our PageMaker test—Canon's tech support department couldn't resolve the problem either.

If your documents are headed for final production on a PostScript printer or imagesetter, you'll also need the PostScript language on your proofing printer. Without PostScript you won't be able to print EPS (Encapsulated PostScript) graphics. None of the printers reviewed here include PostScript capability with their Windows drivers except HP's DeskJet 1200C—but that option pushes its price up to around $2000. (HP's 310 and 1200C models also include drivers for popular DOS applications.) For now, only higher-quality printers offer PostScript.

While we were generally unimpressed with the 203-dpi Fargo Primera thermal-wax printer, it's the only model in this review that can print edge to edge on a letter-size page. If your design features elements that bleed to the edge of the paper, the Primera can produce accurate proofs. Unfortunately, 203-dpi graphics and text look grainy, and the color quality isn't quite up to ink jet standards.

All-Purpose Printing

Home offices use color printers for many of the same tasks as small businesses—but a few special considerations make it harder to pick one perfect printer. For starters, low initial cost is often a fundamental issue, which is why the HP DeskJet 1200C is not a top candidate here. A prime concern is low operating costs, as well

FULL-COLOR quality for less: Star Micronics' SJ-144 (left), Texas Instruments' microMarc Color, and Fargo's Primera Color Printer.

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SYNTHESIS	SOFTWARE INCLUDES:	CREATIVE ENSEMBLE™
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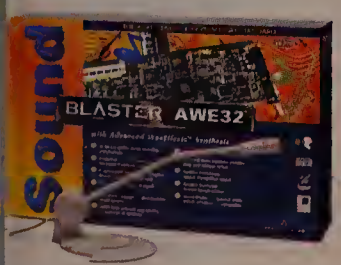

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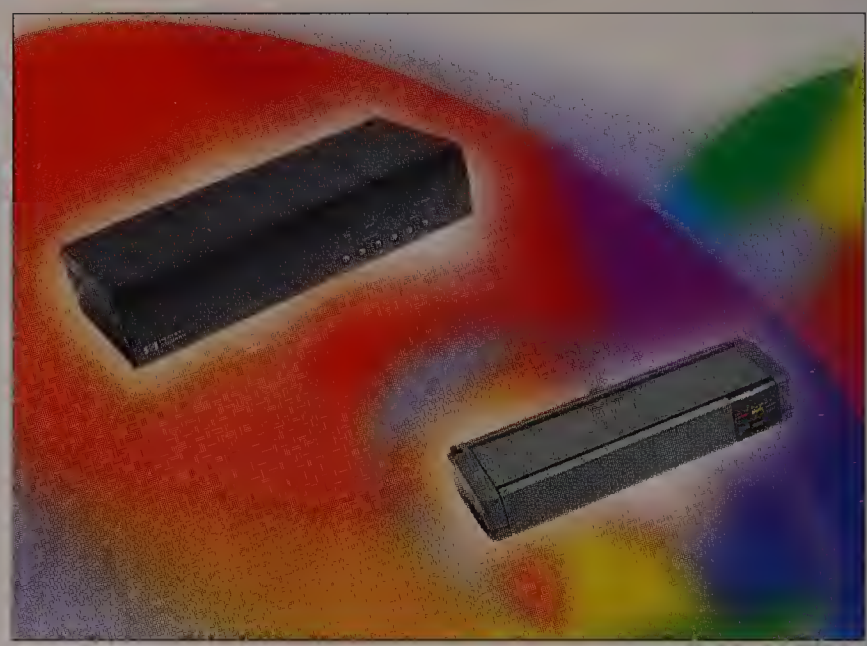
Circle 53 on reader service card

as other issues such as small size, ease of use, and the ability to print readable text in either color or black-and-white.

In most home offices (and many small companies), a low-end color printer is the *only* printer—so it may be cranking out simple black text most of the time. The HP DeskJet 560C is a natural for this scenario. It's quicker than the Canon BJC-600, and its 600-by-300-dpi black text output and resolution enhancement feature make it a good dual-purpose machine.

The 560C is also boss of the ease-of-use department. Its controls are actually more versatile than those of the 1200C, and while its ColorSmart driver does have a few problems consistently printing perfect black, it provides decent results for the most part, requiring little fiddling with color hues.

It's also the third cheapest to operate, though oddly enough, the cheapest printer to run day after day is the 1200C, but it's also the most expensive to purchase. Canon's BJC-600 runs a close second.



COLOR TO GO: Hewlett-Packard's 4.3-pound DeskJet 310 and Citizen's 2.8-pound Notebook II give you colorful prints on the road.

Digital Photos

Increasingly, some home-office businesses (such as real estate brokers showing photos of homes for sale) use color printers to print digital photographs as a replacement for film processing. Here, you have two choices: If you need good image quality and readable text, Canon's BJC-600 is your best home-office bet: Its four separate color ink cartridges reduce color shifts that can occur with trichambered cartridges (like HP's 560C), and its black ink prints crisply on color. Resolution is a high 360-dpi, and page cost is low.

On the other hand, if photo-quality prints are a top priority, the photo-realistic version of Fargo's Primera Color Printer is a perfect choice. Sure, you can buy better dye-sub printers, but they can run as high as $5000. For $915, the Primera delivers continuous-tone color with the level of detail you'd expect from a photograph. Just be prepared to pay for consumables.

How Low Can You Get?

If a rock-bottom price is your priority, check out HP's $300 DeskJet 310. An optional $40 Color Kit (a color-ink cartridge and a holding case) produces great spot color in charts, graphs, and fliers. While this 300-dpi, notebook-size unit is considered a portable printer, many people buy its $70 sheet feeder and use it exclusively on the desktop. The 310's color quality and speed are almost on a par with the 560C's, as is its ease of use. It is slow, however, and feeding pages by hand is tedious (the paper feeder is optional). But it's quite a value for the price.

Three Also-Rans

Texas Instruments' $400 microMarc Color (built by Olivetti) is the second-fastest printer in this review, behind HP's 1200C. Its image detail and smooth color gradients are impressive for a 300-dpi model. Unfortunately, the microMarc's color matching doesn't compare with that of the other ink jets we tested, and text was dense and fuzzy. Page costs are also fairly high (even for home use), and the color cartridge ran out of ink after only 35 pages. (HP's 560C printed 60 pages.)

Citizen's $330 Notebook II and Star Micronics' $500 SJ-144 thermal-fusion printers provide crisp, black text at 360 dpi. But anything beyond simple spot color jobs are prohibitive, given the printers' pricey ribbons. We got only 8 pages from the SJ-144's $9.98 ribbon, and Citizen's 2.8-pound printer is mobile but poky.

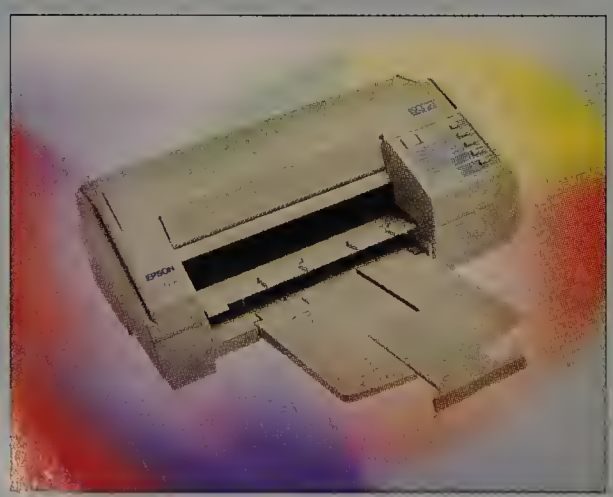
Colorful Finish

HP's DeskJet 1200C is our favorite low-end color printer across the board. At $1400 it's the priciest unit here, but speedy output, fine color coverage, great text

The Latest Colors

Several low-end color printers were announced as we went to press:

- **Epson's $699 Stylus Color is impressive. The sharp text, detailed images, and consistent colors we got clearly give HP's DeskJet 560C and Canon's BJC-600 something to aspire to. Epson's new piezoelectric printhead doubles the resolution to 720 dpi for more detail. (800/289-3776)**
- **The $449 DECcolorwriter 520ic uses the same Olivetti ink jet engine and three-color cartridges as TI's microMarc Color. It targets small office, home office, and personal users. As with TI's model, you need to swap in a cartridge to print black text. (800/777-4343)**
- **Lexmark's $359 ExecJet IIc also uses a three-color cartridge for 300-dpi graphics and 600-by-300-dpi text. Output is fine for spot color or home use. (800/358-5835)**
- **The $499 Canon BJC-4000 prints 720-by-360 text at a fast 5 pages per minute, and graphics at a high 360-dpi. (800/848-4123)**
- **For photo-quality proofs, Fargo's new $1600 PrimeraPro prints at 600 by 300 dpi for smoother text. (800/327-4622)**



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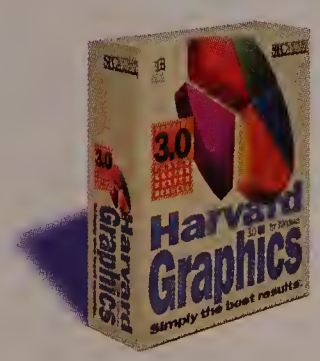

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output, and high graphics quality make it an all-around winner. By delivering top quality on plain paper, the 1200C's per-page operating costs are extremely low. And the networking and PostScript upgrade options are icing on the cake.

For smaller businesses, home offices, and users whose primary print jobs are fliers, brochures, proof copies, and reports, we offer a split recommendation: If you print mainly in color, Canon's $590 BJC-600 is the one to buy. Its 360-dpi color output, low cost per page, and four separate printheads make it a graphics specialist. If black text is your mainstay, and you only occasionally venture into color, the $570 HP DeskJet 560C will yield the most satisfaction, with its higher text quality and resolution-enhancement features.

Not long from now color-capable printers will be the norm. The upcoming release of Windows, dubbed Chicago, promises better color calibration, and a myriad of printer refinements are making the color route more affordable. Depending on your needs, the issue is no longer black and white.

Michael Goodwin is a PC World *contributing editor, and Bob Weibel, formerly with* Publish, *writes from Ashland, Oregon.*

FEATURES COMPARISON

Low-Cost Color Printers: A Spectrum of Choices

● Yes
○ No
n/a = not applicable

	BEST BUY Canon BJC-600	Citizen Notebook II	Fargo Primera Color Printer (photo-realistic)	Fargo Primera Color Printer (thermal wax)	Hewlett-Packard DeskJet 310	BEST BUY Hewlett-Packard DeskJet 560C	BEST BUY Hewlett-Packard DeskJet 1200C	Star Micronics SJ-144	Texas Instruments microMarc Color
Standard features									
Estimated street price	$590	$330	$915	$700	$300[1]	$570	$1400	$500	$400
Resolution (dpi)	360	360	203	203	300	300[2]	300[2]	360	300[3]
Imaging technology	thermal ink jet	thermal fusion	dye-sub	thermal wax transfer	thermal ink jet	thermal ink jet	thermal ink jet	thermal fusion	thermal ink jet
Font cartridge	○	○	○	○	○	○	●	○	○
Built-in fonts (bit-mapped)	20	5	1	1	84	84	10, 35[4]	8	28
Soft fonts provided	20	0	0	0	6[4]	14	14	15	0
Operation									
Lowest power draw (watts)	4	1	10	10	5	8	50	5	25
Maximum power draw (watts)	28	5	50	50	13.5	25	250	66	25
Monthly duty cycle (pages)	600	n/a[5]	100	200	1000	1000	8000	167	1400
Paper handling									
Paper input capacity (pages)	100	5	50	50	1	100	180	30	120
Output capacity (pages)	20	1	30	30	1	25	100	1	20
Straight paper path	○	●	○	○	●	○	●	●	○
Envelope feeder capacity	10	n/a	n/a	n/a	n/a	20	n/a	n/a	1
Optional paper feeder	○	●	○	○	●	○	○	○	○
Supply costs									
Coated paper (per sheet)	$0.10	$0.02	$2.80	$0.11	$0.11	$0.11	$0.11	$0.02	$0.09
Transparencies (per sheet)	$1	$1	$0.74	$0.74	$1.12	$1.12	$1.12	$1	$1.10
Black ink cartridge	$7.50	$4.50	$90	$39.95	$31.95	$31.95	$29.95	$7.50	$22
Color ink cartridge(s)	$8[6]	$6.99	$279.95	$45	$34.95	$34.95	$35[6]	$9.98	$38
Service and support									
Warrany (years)	2	2	1	1	1	3	1	2	1
Toll-free support	●	●	○	○	○	○	○	○	●
Daily tech support hours	11	8.5	11	11	11	11	11	9	12
On-site service	○	○	○	○	○	○	○	○[7]	○[7]
BBS/fax support	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●	●/●
Contact	800/ 848-4123	310/ 453-0614	800/ 327-4622	800/ 327-4622	800/ 752-0900	800/ 752-0900	800/ 752-0900	800/ 447-4700	800/ 848-3927
Reader service no.	800	801	802	802	804	804	804	807	808

[1] Price includes $40 color upgrade kit.
[2] 600 by 300 dpi using black ink.
[3] 600 by 300 dpi using internal fonts.
[4] Intellifonts.
[5] Prints 8 pages per cartridge.
[6] Price per cartridge per color.
[7] Through dealer.

For more information about all products in this table, circle reader service no. 907.

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PC WORLD

SOUND ADVICE

Audio Components for PCs

Assembling a multimedia system? Here's how to buy the best **speakers**, **headphones** and **microphones** for business, entertainment, and education.

By Harry McCracken

IF YOU'RE DISAPPOINTED BY THE SOUND your multimedia PC produces, it's easy to blame your sound card. But don't rush to judgment. Even the best sound card can't live up to its potential if it's equipped with an inferior set of speakers, a second-rate pair of headphones, or a chintzy microphone. Fortunately, the special needs of computer users are being met by an explosion of PC audio components, many of which come from familiar audio names like Altec Lansing, Bose, and Koss.

In the charts that accompany this article, we've rounded up facts and figures on 32 speaker systems from 14 vendors, ranging in price from $29.99 to $699. We've also gathered information on a variety of headphones, headsets, and microphones from several popular manufacturers. Together with the buying advice presented here, these facts should help you find audio components that meet your needs and your budget.

Speakers for Computers

Shopping for PC speakers is similar to shopping for home stereo speakers. It's a matter of knowing a bit about the technology, understanding your needs, and then narrowing the field to a few models. Our guidelines will help get you started. But as with buying traditional speakers, the litmus test comes when you listen to them.

Speakers intended for use with PCs have some unique attributes. First, they should be small enough to fit on a desktop. Also, the speakers should include their own amplifier and be magnetically shielded; the shielding ensures that the magnets inside the speakers won't wreak havoc on your floppy disks or cause the PC's display to wobble. And a built-in amplifier enables them to produce sound at louder volumes than the modest amplifiers used in most sound cards.

The speakers that come bundled with multimedia PCs and upgrade kits meet these standards. But in most instances, these inexpensive models can't do justice to the rich sound produced by today's 16-bit sound cards. By investing a minimum of $100 or so in a better pair of speakers—or starting with them in the first place—you can experience superior sound that will make games more exciting, educational programs more enticing, and business presentations more compelling.

However, investing in high-grade speakers probably won't improve audio across all your programs equally. Business audio applications such as Lotus ScreenCam, for instance, usually use highly compressed digitized speech files that fall into a narrow section of the audio spectrum; even low-end speakers can do an adequate job of playing them back. Also, older games and applications—and even some recent software releases—use 8-bit monophonic audio that won't sound strikingly better through good speakers.

ONE SIZE DOESN'T FIT ALL: (Clockwise from top left) Altec Lansing's ACS300.1 speakers, Bose's Acoustimass Multimedia satellite speakers, Advent's AV 570 speakers, Altec's ACS150 subwoofer, Bose's Acoustimass subwoofer, and Reveal's RS380 speakers.

You'll notice a dramatic difference, though, with the ever-increasing array of software that uses 16-bit stereo digitized sounds and MIDI music, as well as when you use your CD-ROM drive to play audio CDs.

With specific applications in mind, use the pricing and other information in our chart to narrow the field to the most likely candidates. Speakers in the $50-and-under range, such as Labtec's CS-150 and Koss's HD/30, are entry-level models that are generally similar to those found in upgrade kits. From $50 to $150, you'll

FORM, FUNCTION, AND FUN: The EarMic from Blue Sky Technologies, shown left, attaches to the side of your PC and lets you annotate PC documents and E-mail with voice and sound.

PHOTOGRAPHS BY ROBERT CARDIN

find a wide range of speakers that offer a step up in sound quality without breaking your budget. Move above $150 or so, and you'll begin to encounter models aimed at serious audiophiles, including Bose's $699 Acoustimass Multimedia.

Tech Talk When you're buying PC speakers, technical specifications tell only part of the story. For one thing, vendors use different methods to measure them, so vendor-to-vendor comparisons are often impossible. For another, these specs don't take into account the design techniques and materials used in speaker construction, which can vary widely. Two models with seemingly identical specs may have completely different sound quality or be optimized for different environments.

Don't render your verdict on a speaker system's quality until you've heard it connected to your own PC and sound card, in the location in which you'll use it.

As you peruse our chart, you'll notice that the power output specifications appear anemic compared with those of home stereo systems, which often sport 60-watt or 100-watt amplifiers. Entry-level and midrange PC models may offer no more than 5 or 6 watts. Fear not—for most desktop applications, you'll be using the speakers at moderate volume levels within close range, so products in this category will do nicely. For applications that demand high volume (say, filling a large meeting room with sound during a presentation), you should opt for models with high power-output ratings, such as Sony's 20-watt SRS-D2KPC or Advent's 35-watt AV 570.

Most computer speakers are full-range models. This means that each speaker uses a single *driver*—the actual sound-producing device within the cabinet—to reproduce the entire range of sound. Separate woofer and tweeter measurements in the chart mean that the model uses dual drivers in each speaker: a large woofer to produce bass and midrange tones, and a smaller tweeter to handle high tones. Many of the more-expensive speakers are two-way models, including almost all of the Altec Lansing products. But don't ignore all full-range models—Bose's RoomMate Computer Monitor speakers are full-range units that produce great sound.

For maximum bass output, consider a speaker system that uses a separate woofer unit, called a *subwoofer*, such as Bose's high-end

Speakers

Company	Product	List price	KEY FEATURES: Components	Power output per channel (in watts)	AC power
ADVENT [1] 800/477-3257	AV 22	$99	two 2.5" speakers	3	●
	AV 570	$399	two speakers with 5" woofers and 1" tweeters	35	●
	AV 622	$349	two 2.5" satellites, one 6" subwoofer	speakers 8; subwoofer 30	●
ALTEC LANSING 800/648-6663	ACS50	$100	two 2.5" x 1.25" speakers and one amplifier unit	4.5	●
	ACS100.1	$129	two speakers with 3" woofers and 0.5" tweeters	6	●
	ACS300.1	$350	two satellites with 4" woofers and 0.5" tweeters, one subwoofer with two 4" woofers	speakers 9; subwoofer 9	●
BOSE 800/444-2673	RoomMate Computer Monitor	$339	two 4.5" speakers	n/a	●
	Acoustimass Multimedia	$699	two 2.5" satellites, one 5.25" subwoofer	speakers 20; subwoofer 50	●
CAMBRIDGE SOUNDWORKS 800/367-4434	SoundWorks by Henry Kloss	$199	two 2" satellites, one 4.5" subwoofer	n/a	●
JENSEN 800/677-6863	JPS 35	$99	two 3.25" speakers	2	●
	JPS 45	$149	two speakers with 3.25" woofers and 2" tweeters	5	●
KOSS 800/872-5677	HD/30	$29.99	two 3" speakers	1.5	[2]
	HD/50	$49.99	two 3.5" speakers	4.5	[2]
	HD/100	$99.99	two speakers with 4" woofers and 1.5" tweeters	5	●
LABTEC ENTERPRISES 206/896-2000	CS-150	$39.95	two 3" speakers	3.6	[2]
	CS-600	$59.95	two 3" speakers	5	[2]
	CS-1000	$149.95	one under-monitor unit with 5" woofer and two 2" tweeters	5	●
	CS-1400	$179.95	two speakers with 3" woofers and 2" tweeters	15	●
MIDI LAND 909/592-1168	MLI-691	$69	two 3" speakers	4	●
	MLI-155	$159	two speakers with 4" woofers and 1.25" tweeters	15	●
PANASONIC 800/742-8086	EAB401P	$119	two 1.6" by 1.1" oval speakers	2	●
	EAB710P	$249	two 4.7" by 1.6" oval speakers with one 2.6" integrated subwoofer	speakers 3.5; subwoofer 7	●
REVEAL COMPUTER PRODUCTS 800/326-2222	RS380	$99.99 [3]	two speakers with 4" woofers and 1.25" tweeters	40	●
ROLAND 213/685-5141	MA-7	$99	two 3" x 5" speakers	7	●
	MA-12C	$249	two 4" speakers	10	●
	CS-10	$49	one under-monitor unit with 1.5" woofer and two 2" tweeters	6	●
SONY 800/342-5721	SRS-PC30	$79.95	two 2.6" speakers	3	●
	SRS-PC50	$129.95	two 2.6" speakers	5	●
	SRS-D2KPC	$199.95	two 3.6" satellites, one 4.75" subwoofer	20	●
SOUND MINDS TECHNOLOGY 408/374-7070	Twin Sound	$59	one drive-bay unit with two 2" speakers	10	[5]
YAMAHA 714/522-9937	YST-M5	$99.95	two 2.5" speakers	3	●
	YST-M10	$149	two 3.5" speakers	10	●

● = Yes, ○ = No n/a = not available from vendor

[1] Formerly sold under the Acoustic Research name. [2] Option. [3] Estimated street price. [4] 90 days labor, 1 year parts. [5] Through computer.

Acoustimass Multimedia. With these systems, midrange and high-frequency sounds are produced by two small satellite speakers, while the larger subwoofer provides deep, rich bass. Subwoofers can be quite large and heavy—the Acoustimass Multimedia unit resembles a small air conditioner—but since you can place them out of the way under a desk, their size won't cramp your style.

Big Sound, Small Package Audio quality is the most important consideration when comparing speakers, but it's not the only one. If space is tight, you'll want to look at space-efficient designs. Models such as Panasonic's EAB401P are small and lightweight enough to be mounted to the sides of a PC's monitor. Labtec's CS-1000, Roland's CS-10, and other units put the speakers and controls in a single case that fits under a PC monitor. Sound Minds Technology's Twin Sound goes even further, cramming a stereo speaker system into a PC's 5¼-inch external drive bay.

Input and output options also vary widely from model to model. Designs with multiple stereo inputs let you plug in another audio source besides your sound card, such as a portable CD or audiotape player. Anyone planning to use headphones or a microphone should look for speakers that offer jacks for these devices; such models will reduce the cable clutter behind your PC.

				SUPPORT		
Battery power	Microphone jack	Headphone jack	Inputs for audio sources	Warranty	Toll-free service	Reader service no.
○	○	●	1	2 years	●	620
[2]	○	●	1	2 years	●	620
○	○	●	1	2 years	●	620
○	○	●	2	2 years	●	624
○	○	●	2	2 years	●	624
○	○	●	2	2 years	●	624
○	○	○	1	1 year	●	630
○	○	○	2	1 year	●	630
●	○	●	1	7 years	●	632
○	○	○	1	5 years	●	633
○	○	●	1	5 years	●	633
●	○	○	1	lifetime	●	636
●	●	●	1	lifetime	●	636
○	●	●	1	lifetime	●	636
●	○	○	1	1 year	○	641
●	○	●	1	1 year	○	641
○	○	●	2	1 year	○	641
○	●	○	2	1 year	○	641
○	○	○	1	1 year	○	647
○	○	○	1	1 year	○	647
○	○	○	1	1 year	●	649
○	●	●	1	1 year	●	649
○	○	○	1	90 days	●	651
○	●	●	2	90 days [4]	○	652
○	●	○	2	90 days [4]	○	652
○	○	●	2	90 days [4]	○	652
○	○	○	1	1 year	○	657
○	○	●	2	1 year	○	657
○	○	○	2	1 year	○	657
○	●	●	2	1 year	○	660
○	○	○	2	1 year	○	661
○	○	○	2	1 year	○	661

For more information about all products in this article, circle reader service number 910.

Five Tips for Great Sound

1 Start With a 16-Bit Sound Card If your sound card is an 8-bit model, good speakers won't enhance your auditory experience. Step up to a 16-bit card, preferably with wave-table synthesis for realistic MIDI music; street prices begin at about $100.

2 Fight PC Noise Do your speakers buzz? They may be picking up clock noise or electromagnetic interference. To reduce or eliminate the buzz, reduce the sound card's volume level and keep the speaker cables away from the PC's power cord.

3 Separate Your Speakers PC speakers are designed to sound their best in cramped quarters, but the stereo effect is still strongest if they're 15 to 24 inches apart.

4 Surround Yourself With Sound Sound Retrieval System (SRS) technology adds an uncanny 3-D effect to both monophonic and stereo sound. SRS is incorporated into Vivid 3D, an add-on box from NuReality that plugs in between a PC's sound card and speakers; it's also built into some new sound cards. *Vivid 3D, $79.95; NuReality; 800/501-8086. Reader service no. 664*

5 Connect With Your Stereo If your PC is in the same room as your stereo system, the stereo's amplifier and speakers can do double duty—an especially worthwhile approach if you've already invested in expensive traditional audio components. In most cases, you connect your sound card to the stereo's inputs with a stereo mini (⅛-inch) plug-to-dual-phono-plug cable.

Headphones for Privacy

If you work in an open cubicle at the office, blasting sound through speakers won't help you win friends or influence colleagues. In other situations—say, if you're listening to audio notes attached to E-mail messages—you may not want others to listen in. In either case, using headphones provides a level of privacy speakers can't offer. Use the guidelines provided here to narrow the field, and then check out a few models to find headphones that fit your needs.

Ergonomic considerations are critical when selecting headphones. To really lose yourself in the fantasy of a game with a heavy-duty sound track, opt for *circumaural* headphones, which surround the entire ear in a cushioned cup and block out external noises. If you need to remain aware of office sounds, such as a ringing telephone, you have two options: *supra-aural* models, which have small, foam-covered cups that rest lightly on your ears; or *monaural* headphones, which provide a cup for each ear but pump sound into only one side.

Regardless of the type of headphone you choose, always look for models with a cord that's at least 7 feet long, so you don't give yourself whiplash if you stand up without removing them.

Talk to Your PC

Not everyone who uses speakers or headphones also needs a microphone, but applications in which you speak to your PC as well as listen to it are becoming increasingly common. They include everything from high-end voice recognition programs like Dragon Systems' DragonDictate to mainstream business programs such as the Sound Recorder applet that comes with Windows 3.1.

Microphone design plays such a crucial role in voice recognition accuracy that most such packages come bundled with a suitable mike. In some cases (for example, Microsoft's Windows Sound System), the software has been tuned to work specifically with the bundled microphone.

If you need to buy a microphone, choose a model that filters out extraneous noise. Generally, unidirectional models, which pick up sound only from the direction they're pointed in, provide superior performance over omnidirectional units, which have a 360-degree listening range. More-expensive units, such as Shure's SM10A-CN, use special noise-canceling electronics to block out unwanted sound.

Microphones typically use one of two technologies to capture sound: *dynamic* and *electret condenser*. Less-expensive microphones tend to be dynamic designs and are fine for uses other than voice recognition. Pricier units intended for voice recognition usually use electret condensers. One exception is Shure's SM10A-CN, a dynamic unit that voice recognition vendor Dragon Systems highly recommends. When in doubt, consult the vendor of the software you'll be using with the microphone.

As with headphones, microphone ergonomics are as important as technology. Traditional, large hand-held microphones such as Koss's M/11 are fine for some applications (say, PC karaoke), but picking one up repeatedly can literally be a pain. Mikes that sit in a desk stand or mount on your PC's monitor provide hands-free recording. One interesting option is Blue Sky's $24.99 EarMic. This omnidirectional, electret condenser microphone is shaped like an ear and fastens with Velcro to your PC or monitor.

Buyers' Guide

Purchasing PC audio equipment, such as speakers, microphones, and headphones, is a subjective process. You're better off trying out products before you buy them. For an affordable alternative to the cheap speakers that come with many upgrade kits, check out Altec Lansing's $100 ACS50. This compact speaker system pumps out crisper sound than you'd expect from a unit in its size and price range. If your budget is a bit more robust, consider Advent's $399 AV 570 system; it provides great sound at both low and high volumes. And big spenders and audiophiles can't go wrong with Bose's $699 Acoustimass Multimedia system, which features a subwoofer for chest-pounding bass.

Harry McCracken, a Boston-based writer, covers multimedia issues.

Microphones

Company	Product	List price	Description	Warranty	Toll-free support	Reader service no.
ALTEC LANSING 800/648-6663	AM10	$25	Unidirectional electret condenser microphone	2 years	●	679
BLUE SKY TECH. 800/914-3277	EarMic	$24.99	Ear-shaped omnidirectional electret condenser microphone	90 days	●	680
KOSS 800/872-5677	M/11	$9.99	Hand-held unidirectional dynamic microphone	90 days	●	681
	M/21	$39.95	Battery-powered unidirectional electret condenser microphone	90 days	●	681
LABTEC ENTERPRISES 206/896-2000	AM-22	$19.95	Hand-held unidirectional dynamic microphone with on/off switch	1 year	○	683
SHURE BROTHERS 708/866-2200	SM10A-CN	$156.50	Unidirectional dynamic microphone with noise canceling	1 year	●	684
SONY 800/342-5721	F-PC30	$29.95	Unidirectional dynamic hand-held microphone	1 year	○	685

Headphones and Headsets

Company	Product	List price	Description	Warranty	Toll-free support	Reader service no.
ALTEC LANSING 800/648-6663	AHS10	$50	Circumaural stereo headset with unidirectional electret condenser microphone	2 years	●	665
INTERACTIVE 800/292-2112	SoundXchange Model A	$76	Telephone handset device with electret condenser microphone	1 year	●	666
KOSS 800/872-5677	GT/3	$14.99	Circumaural stereo headphones with covered headband	lifetime	●	667
	SB/25	$44.99	Monaural headset with circumaural ear cushion and unidirectional microphone	lifetime	●	667
LABTEC ENTERPRISES 206/896-2000	C-15	$19.95	Monaural headset with omnidirectional dynamic microphone	1 year	○	669
	C-22	$29.95	Supra-aural stereo headset with omnidirectional dynamic microphone	1 year	○	669
NOISE CANCELLATION TECH. 800/278-3526	NoiseBuster	$149	Supra-aural stereo headphones with noise-reduction electronics	1 year	●	671
RECOTON 800/732-6866	EG 22	$5.95	Stereo earbuds in winder case	1 year	●	672
	W 500	$129.95	Wireless circumaural headphones with transmitter	1 year	●	672
SONY 800/342-5721	MDR-007PC	$9.95	Supra-aural stereo headphones	1 year	○	675
	MDR-009VPC	$19.95	Supra-aural stereo headphones with volume control	1 year	○	675
YAMAHA 714/522-9937	RH5M	$59.95	Semiopen circumaural stereo headphones	1 year	○	677
	MH100	$69.95	Supra-aural stereo headset with unidirectional electret condenser microphone	1 year	○	677

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MEDALIST 340xe	ST3391A	341 MB	13 MS	13.3 MB/s	FAST ATA	2 YEARS
MEDALIST 425xe	ST3491A	428 MB	14 MS	13.3 MB/s	FAST ATA	2 YEARS
MEDALIST 455	ST3550A	452 MB	12 MS	13.3 MB/s	FAST ATA	2 YEARS
MEDALIST 540	ST3655A	528 MB	12 MS	13.3 MB/s	FAST ATA	2 YEARS
DECATHLON 545	ST5660A	545 MB	12 MS	13.3 MB/s	FAST ATA	2 YEARS
MEDALIST 720	ST3780A	722MB	12MS	13.3 MB/s	FAST ATA	2 YEARS
MEDALIST 1080	ST31200A	1083 MB	12 MS	13.3 MB/s	FAST ATA	3 YEARS

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We give the latest CD-ROMs a spin

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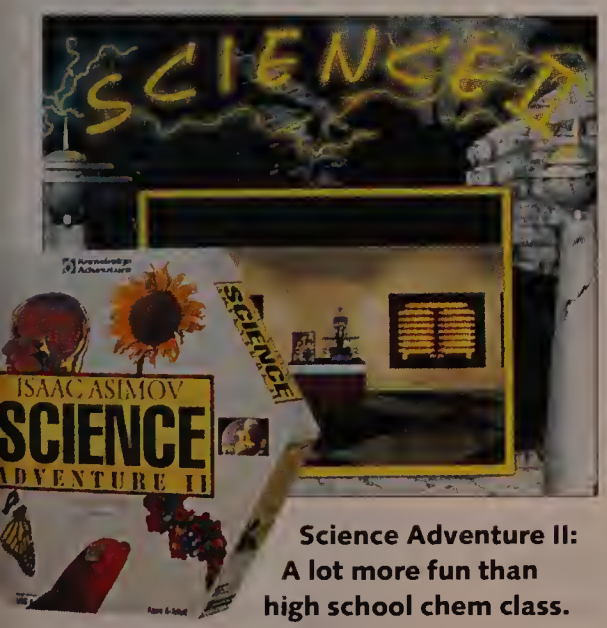
SO MANY CD-ROMS, SO LITTLE TIME. Or so it seems, as new titles hit store shelves every day. How do you know what's hot and what's not? That's why we're here. *PC World* editors take a critical look at the latest crop of educational, entertainment, and reference CD-ROM titles. Among our favorites: Science Adventure II for kids, Microsoft Complete Baseball for the complete fanatic, and SimCity on CD ROM for pure fun.

Take me out to the ball game. Microsoft Complete Baseball brings the stats, sights, and sounds of America's game to the PC.



Science Adventure II: A lot more fun than high school chem class.

Normandy: The Great Crusade

Last June the Discovery Channel broadcast a documentary, "Normandy: The Great Crusade," to mark the 50th anniversary of the Allied invasion. This companion CD-ROM lets you explore the same subject interactively. Not surprisingly, given the source, the disk has lots of good footage, and the producers have done a great job of expanding on this TV material for the CD-ROM format. Unfortunately, the accompanying narration is overdramatic and superficial. You can view the disk in the passive AutoPilot mode, which is like watching the TV show, or you can guide yourself through the program as your interests dictate. You can also listen to sound clips from radio broadcasts and study maps (some of which are animated). My only question about this generally excellent disk: How many times will buyers want to watch it? Normandy: The Great Crusade lists for $49.95. Discovery Enterprises, 301/986-0444. —*Dan Miller*

Reader service no. 688

Science Adventure II

Who says science can't be fun? In Knowledge Adventure's new Science Adventure II, you explore a three-dimensional lab that's filled with a dizzying range of imaginative exhibits, displays, and games. In the Science Theater, you can watch videos about the history of inventions and inventors. You can take a tour through a science convention, arrest incompetent scientists, and send them off to jail. You can even "ride" a roller coaster while learning about the forces of gravity. The animation and video clips are excellent. There's even a learning guide that helps parents and children get the most from this $69.95 disk. Knowledge Adventure, 800/542-4240. —*Dean Andrews*

Reader service no. 689

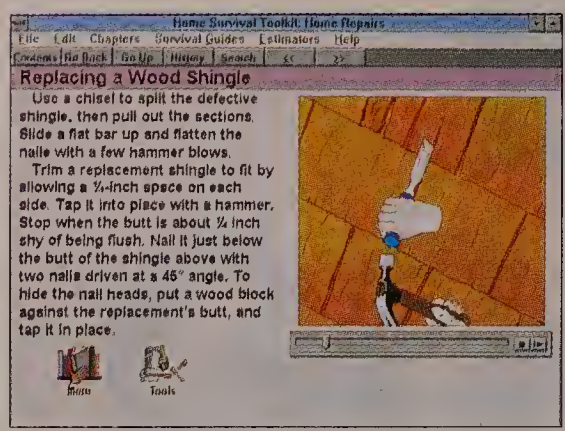
Microsoft Complete Baseball

Microsoft hits a home run with Complete Baseball, a comprehensive history of the game in pictures, sounds, video, and text. Check out St. Louis Browns first baseman Charlie Comiskey's 1882 statistics or Barry Bonds's numbers from 1993. Click to watch a video of Bobby Thomson's 1951 "shot heard 'round the world" or to hear Casey Stengel mangling the English language before Congress in 1958. For up-to-date info, dial in to Microsoft's online bulletin board and download Baseball Daily, which provides news, scores, and statistics from the previous day. Complete Baseball lists for $59.95; Baseball Daily is $1.25 a pop. Microsoft, 206/882-8080. —*Steve Fox*

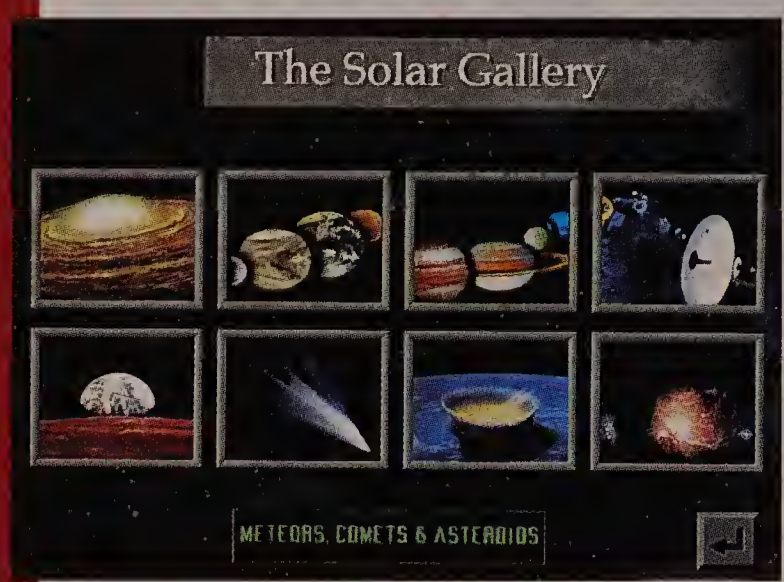
Reader service no. 690

The National Health Care Debate

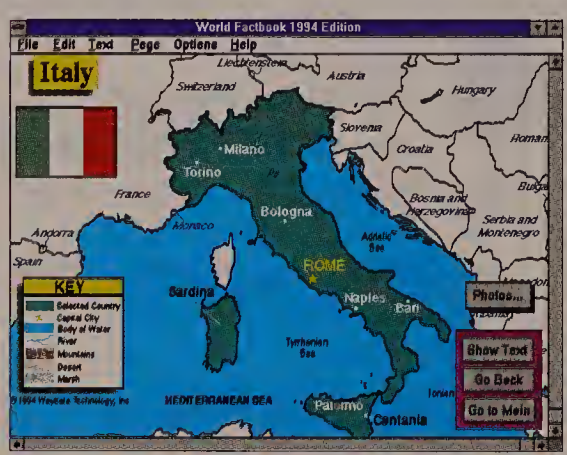
If you've stared at those bumper stickers that read "Single Payer Health Care" and felt uninformed on the subject, you probably need somebody to explain



Animations make Home Repair Encyclopedia easy to follow for do-it-yourselfers.

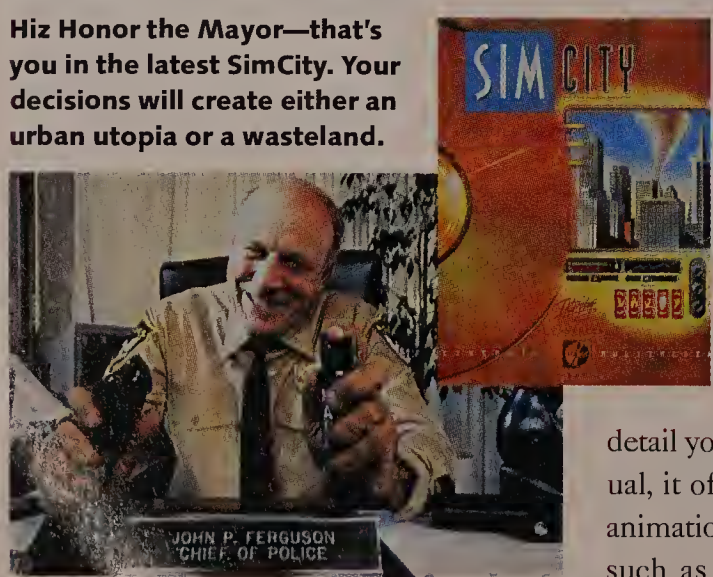


Plumb the mysteries of the universe with Beyond Planet Earth. The easy-to-navigate interface makes star travel a snap.



World Factbook puts the world at your fingertips—but some of the info is dated.

Hiz Honor the Mayor—that's you in the latest SimCity. Your decisions will create either an urban utopia or a wasteland.



health care reform without hype or bias. Unfortunately, The National Health Care Debate won't quite do that. It has all the information you could ever want on the subject—and it's devoid of an agenda. But get ready to plow through scads of health care legislation to understand the issues. If you don't mind taking the time to read about and understand this stuff, or if you want the real data at your fingertips to check against the rhetoric of lobbyists and politicians, the title is worth its $79.95 price. If it provided an overview of health care issues, the disk might be an invaluable guide. I-Mode Publications, 800/370-6717. —*Christina Wood*

Reader service no. 691

Beyond Planet Earth

Journey to the cosmos with the Discovery Channel's otherworldly CD-ROM, which uses video, photographs, illustrations, and text to explain the mysteries of our solar system and beyond. Although many of the video clips of celestial bodies are blurry, Beyond Planet Earth is among the best space exploration disks I've seen. Its interface is easy to navigate, and the program contains a wealth of information on everything from the fate of the dinosaurs (blame the comets) to speculation about a staffed mission to Mars. It also includes more than 200 photographs, many taken by unstaffed NASA space probes and the Hubble Space Telescope. Beyond Planet Earth is a good buy at $49.95. Discovery Enterprises, 301/986-0444. —*Jeff Bertolucci*

Reader service no. 692

Home Repair Encyclopedia

Rather than buy a thick do-it-yourself manual on home repairs, you might want to shell out $49.95 for Home Repair Encyclopedia from Books That Work. While this repair guide on a disk lacks the level of detail you'd find in a traditional repair manual, it offers one major advantage: Simple animations show you how to perform tasks such as fixing squeaky floors and filling cracks in concrete. (The animations include cool sound effects that simulate, for example, the scraping of a steel trowel against concrete.) However, the traditional repair manual does have an edge when it comes to portability: If you're, say, repairing a broken fence outdoors, you'd probably bring along a repair book for easy reference. But if you wanted to review Home Repair Encyclopedia, you'd have to trudge back inside the house to your multimedia PC. (Or if you're really twisted, you'd bring your PC outside.) Books That Work, 800/242-4546. —*J. B.*

Reader service no. 693

SimCity on CD ROM

Even in its original floppy-disk–based format from Maxis, SimCity was a dangerously habit-forming software toy. You had to create houses and factories, build power stations and airports, connect them all with roads, string power lines, set municipal policies—and then sit back and watch your city grow. Or wither and die. Interplay's new multimedia CD-ROM version of SimCity is virtually a reinvention of the original. Thanks to full-motion video, you can, for instance, be harassed by actors threatening you with violence if you don't deliver funding for earthquake repairs. And it features a myriad of convincingly realistic disasters to worry about—including a monster attack. If this sounds more like work than fun, well, consider it a playful challenge. I must admit I found it hugely entertaining. The CD-ROM lists for $59.95. Interplay, 800/969-4263. —*Michael Goodwin*

Reader service no. 694

World Factbook 1994 Edition

World Factbook 1994 Edition is a geographic encyclopedia with government and economic profiles, maps, pictures, charts—even listings of local terrorist groups. The information is detailed, if a bit dated—some statistics are two or three years old. While the maps are somewhat helpful, I wouldn't use them as a reference (for instance, Italy's map is missing Florence). The pictures are disappointing as well. Most are faded black-and-white photos that bring to mind 1950s geography books. The $25 CD-ROM includes some

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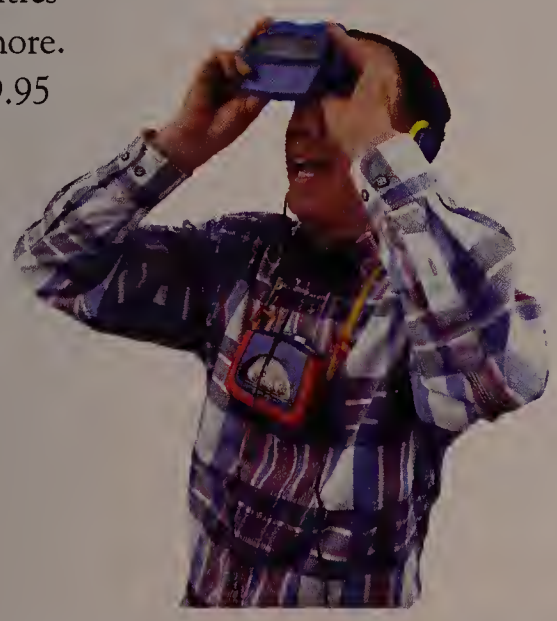

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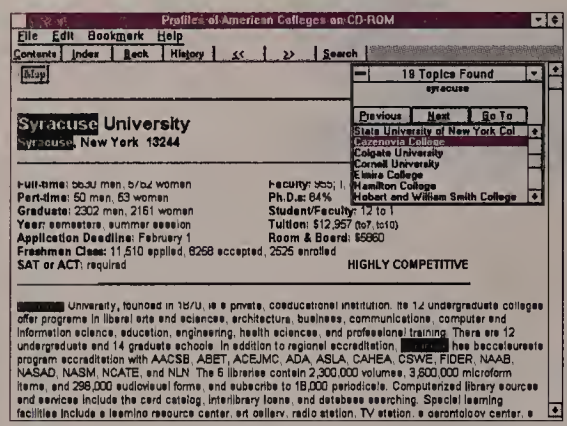
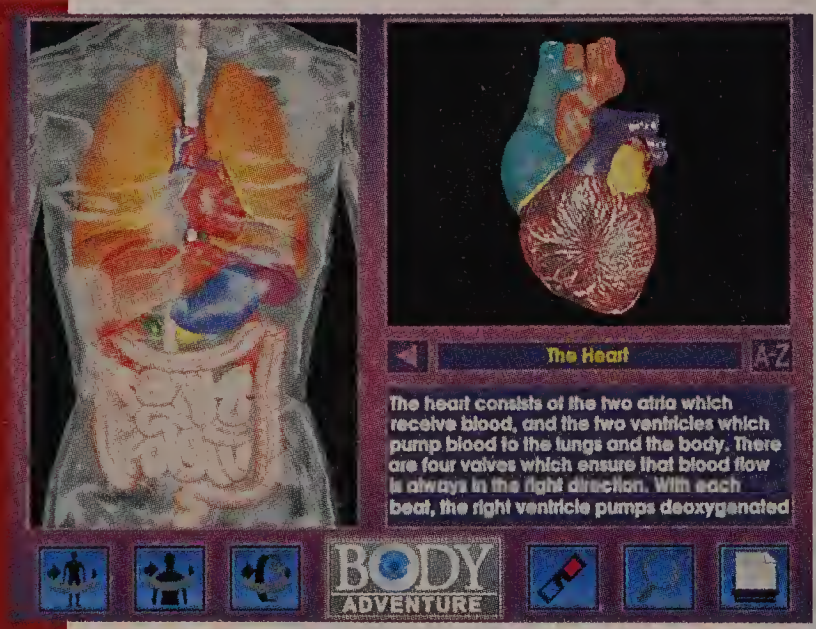
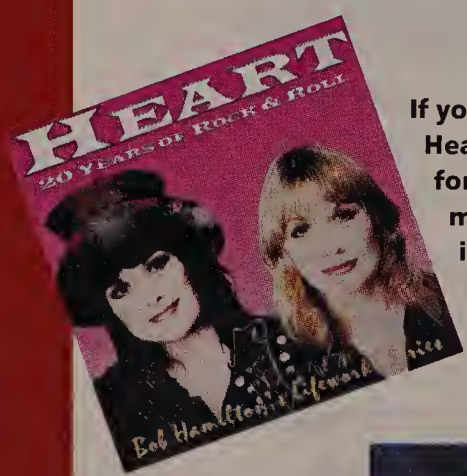


Barron's Profiles of American Colleges has info on your prospective alma mater.



3-D Body Adventure is an anatomy primer for kids and parents. Great graphics.



If you're a die-hard Heart fan, this is for you—but the music beats the interviews.

Meet Wallobee Jack in the Bingi Burra Stone and Thai Sun Adventure games.

color photographs but no captions. If you're looking for a geography lesson, you'd do better to spend your money on a world atlas. Wayzata Technology, 800/735-7321, 218/326-0597. —*Arden M. Hoffman*

Reader service no. 695

Barron's Profiles of American Colleges on CD ROM

The powerful search capabilities of this $99 guide to four-year colleges offer an obvious advantage over the book version, but you won't find any fun multimedia fluff like sound and video. The fanciest this CD-ROM gets is providing colorful maps of a college's home state. While video tours of the campus and dorms would be a helpful addition, for accurate, comprehensive information on U.S. colleges (and U.S.-affiliated foreign schools), Barron's can't be beat. Laser Resources, 800/535-2737, 310/324-4444. —*Caroline Jones*

Reader service no. 696

Heart 20 Years of Rock & Roll

Where were you in 1976? Are you old enough to remember streaking, Top 40 music, and "Keep on Truckin'" T-shirts? If you are, then songs by the rock group Heart, such as "Magic Man," "Dreamboat Annie," and "Crazy on You," are forever embedded in your brain. With Heart's new CD-ROM, you can listen to music clips from more than 100 of the band's songs, hear interviews with Ann and Nancy Wilson (the two sisters who form the heart of Heart), and see assorted video clips. While I have to admit it was fun listening to Heart's old Top 40 hits, the interviews with the Wilsons were mostly boring and insipid (Ann: "I can play a line and make it sound cool"). Although hard-core Heart fans may enjoy this $49.95 CD-ROM, no one will enjoy the disk's technical problems: It crashed my system every time I ran it. The New CD Music Show, 408/626-1571. —*J. B.*

Reader service no. 697

3-D Body Adventure

Sister Theresa, my high school biology teacher, would have loved 3-D Body Adventure, the latest in Knowledge Adventure's series of science-educational CD-ROMs. This $69.95 disk brings human anatomy and physiology to life in a way that Sister Theresa's dilapidated anatomical model, Dave, never could. 3-D Body Adventure has three main components: a reference section (including 3-D models of the human body, which you can rotate to view at different angles) and two games. The first is Emergency Room, in which you (or your children) play doctor and learn about a variety of illnesses and injuries; the second game is Body Recall, in which you match a picture of a body part with its name or function. Although 3-D Body Adventure offers information about common ailments, don't mistake it for a family medical guide—it doesn't provide that level of detail. However, it does offer an interesting, easy-to-understand guide for kids and parents studying anatomy for the first time. Knowledge Adventure, 800/542-4240. —*Roberta Furger*

Reader service no. 698

The Bingi Burra Stone, The Thai Sun Adventure

At first I wasn't sure what to make of the two new Wallobee Jack CD-ROMs from WordPerfect. Dubbed "interaction cartoons," they're a cross between Indiana Jones movies and Road Runner cartoons. It's an odd combination, but it works. Both The Bingi Burra Stone and The Thai Sun Adventure feature Wallobee Jack, a kangaroo; his female sidekick, Francesca Felini; and Dagon, a not-so-nice crocodile who gets blown up more times than Wile E. Coyote. Here's how it works: Jack and Francesca travel to exotic places in search of treasures—with Dagon always hot on their trail. Throughout the story are "hot spots" that you must find to outsmart Dagon—and to get to the treasure. While these games are challenging, if you're looking for educational programs for your kids, look elsewhere. But for fun and adventure, they're worth considering. WordPerfect says these $29.95 games are targeted at the 4-to-10-year-old set, but that's a bit of a stretch for the younger crowd. WordPerfect, 800/451-5151. —*R. F.*

Reader service no. 699

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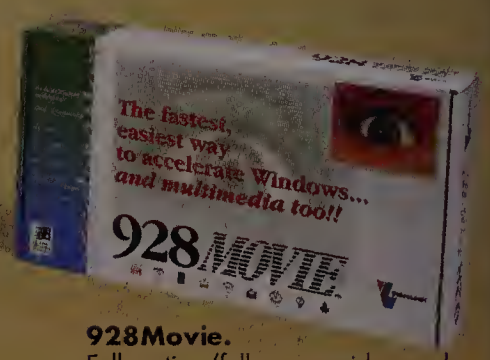

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VideoLogic

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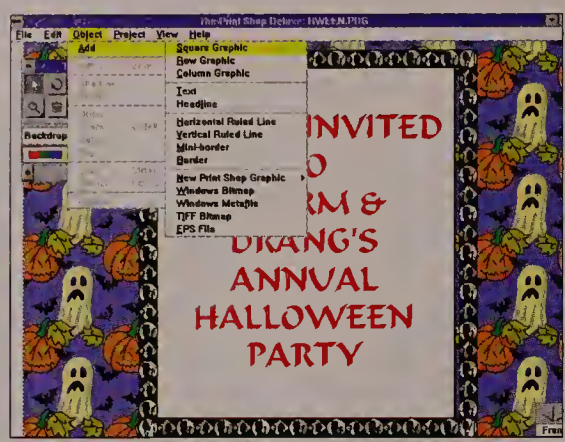
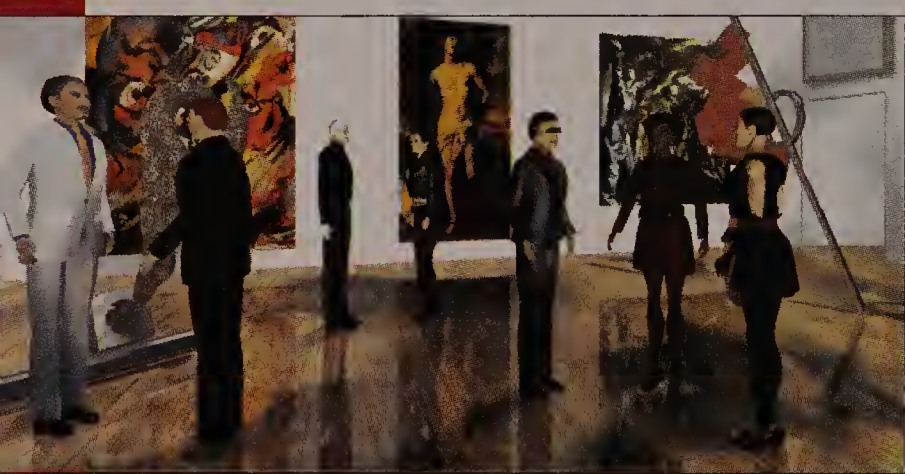
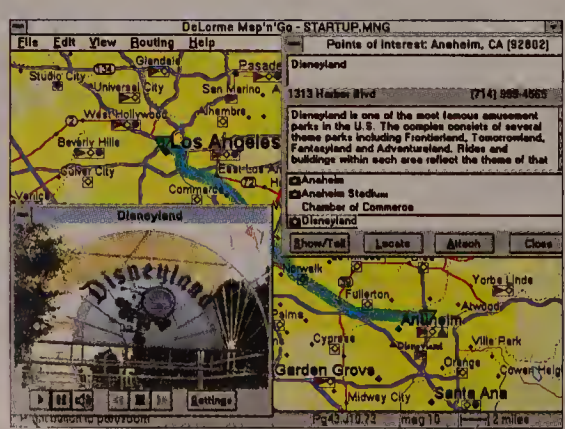


Inserting graphics in Print Shop Deluxe couldn't be easier; you can use one of the more than 1000 pieces of clip art on the CD-ROM or import your own images.

Leonardo da Vinci's inventions come to life in Leonardo the Inventor.



Millennium Auction's gallery is filled with art treasures, but the overheard conversations can be even more valuable to you.



Map 'n' Go's database of over 25,000 hotels, campgrounds, restaurants, and landmarks lets you plan your trip down to the last detail.

Print Shop Deluxe CD Ensemble 2.0

Judging from the popularity of Broderbund's Print Shop Deluxe, most home PCs are really just elaborate tools for creating birthday cards and welcome-home banners. Whatever the reasons, the program has been a perennial best-seller since it was introduced ten years ago. Print Shop Deluxe CD Ensemble takes this classic application and bundles it with four utilities. Three of the four are clip art and font collections. The fourth utility, Print Shop Deluxe Companion, contains templates for a variety of documents, including certificates, envelopes, and business cards. All told, the CD Ensemble provides you with 73 scalable TrueType fonts, more than 1000 pieces of clip art, and a jillion text effects. Despite this embarassment of riches, Print Shop Deluxe is as easy to use as ever: The Windows installation procedure is completely hassle free (although it would be nice to be able to preview fonts before they're installed). When you open the program, it prompts you to pick a type of project (banner, sign, greeting card, calendar, or letterhead, for example), then walks you through the process of laying out the page. For a list price of $80, Print Shop Deluxe CD Ensemble makes desktop publishing easy and affordable for home and small office users. Broderbund Software, 800/521-6263. —*D. M.*

Reader service no. 845

Leonardo the Inventor

There's no doubt Leonardo da Vinci is one of history's most accomplished figures. Too bad Leonardo the Inventor doesn't measure up. This CD-ROM focuses on the inventions the genius sketched in his journals. Each invention is illustrated by an animated drawing of the device and a video clip of the technology in use today. The voice-overs and the animations—more than 50, 8 of them in 3-D—provide a good overview of Leonardo's work, but the videos convey little information about how the inventions are used now. Quotes from Leonardo's journal add interest, a time line puts Leonardo's life in the context of his time, and a biography lends a larger sense of the man's life. The $49.99 CD-ROM is attractively designed, but once you get beyond the wrapping there's little there. Still, it's the easiest CD-ROM to install I've ever seen. Interactive Electronic Publishing, 914/426-0400. —*Russell Glitman*

Reader service no. 846

Millennium Auction

The world's gone belly-up, and now the entire planet has one government and one paperless economy. Objets d'art and memorabilia have accrued such value that the purchase and resale of a single item can make you a millionaire overnight. Welcome to the next century, where the auction house replaces the stock market and real estate as the path to wealth and power. Eidolon's $69.95 Millennium Auction fashions itself as a twenty-first century version of Monopoly. In this game you don't roll dice and make your move. Rather, you eavesdrop on conversations in the art gallery, research objects for sale by checking videocasts and radio reports, and talk with Zeke, the auction room janitor.

This auction is not without humor. Items for sale include "former" President Clinton's saxophone. The game can be played with four humans or a crew of animated robotic opponents. The two-disk package is filled with a landscape of sights and sounds to keep you enthralled. Eidolon, 714/884-7095. —*Michael S. Lasky*

Reader service no. 847

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Forget AAA. Plan your own car trips to almost anywhere in North America with DeLorme Mapping's Map 'n' Go. Enter a starting point and destination, and the program calculates distance and driving time based on your preferences. Double-clicking the map route produces a pop-up menu of points along the way, such as hotels, restaurants, and landmarks (many with photos and narration), which you can add to the travel plan. The program comes with a 128-page atlas of North America. Map 'n' Go has a street price of $50. DeLorme Mapping, 800/452-5931, 207/865-1234. —*C. J.*

Reader service no. 848

For more information about all products in this article, circle reader service no. 904.

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THE PERSONAL VIDEO STUDIO

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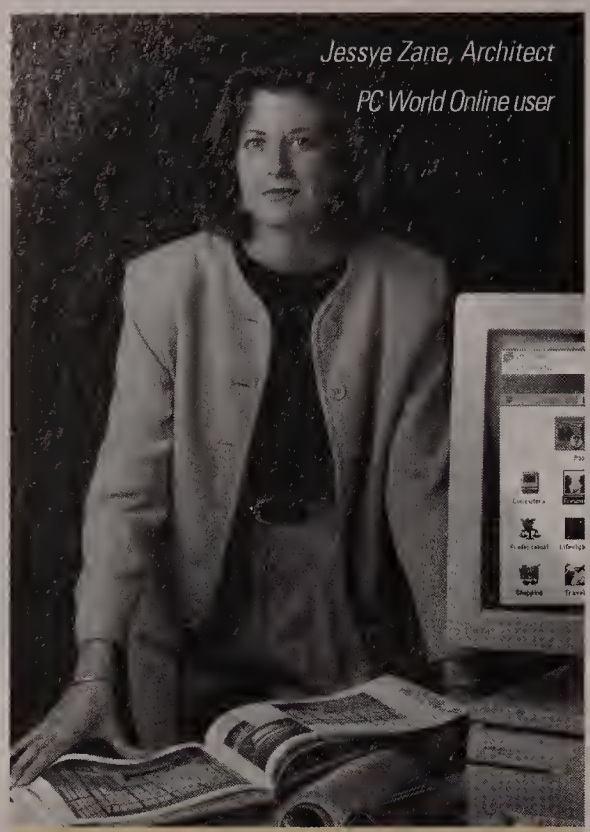

This morning Jessye Zane,

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who is very particular

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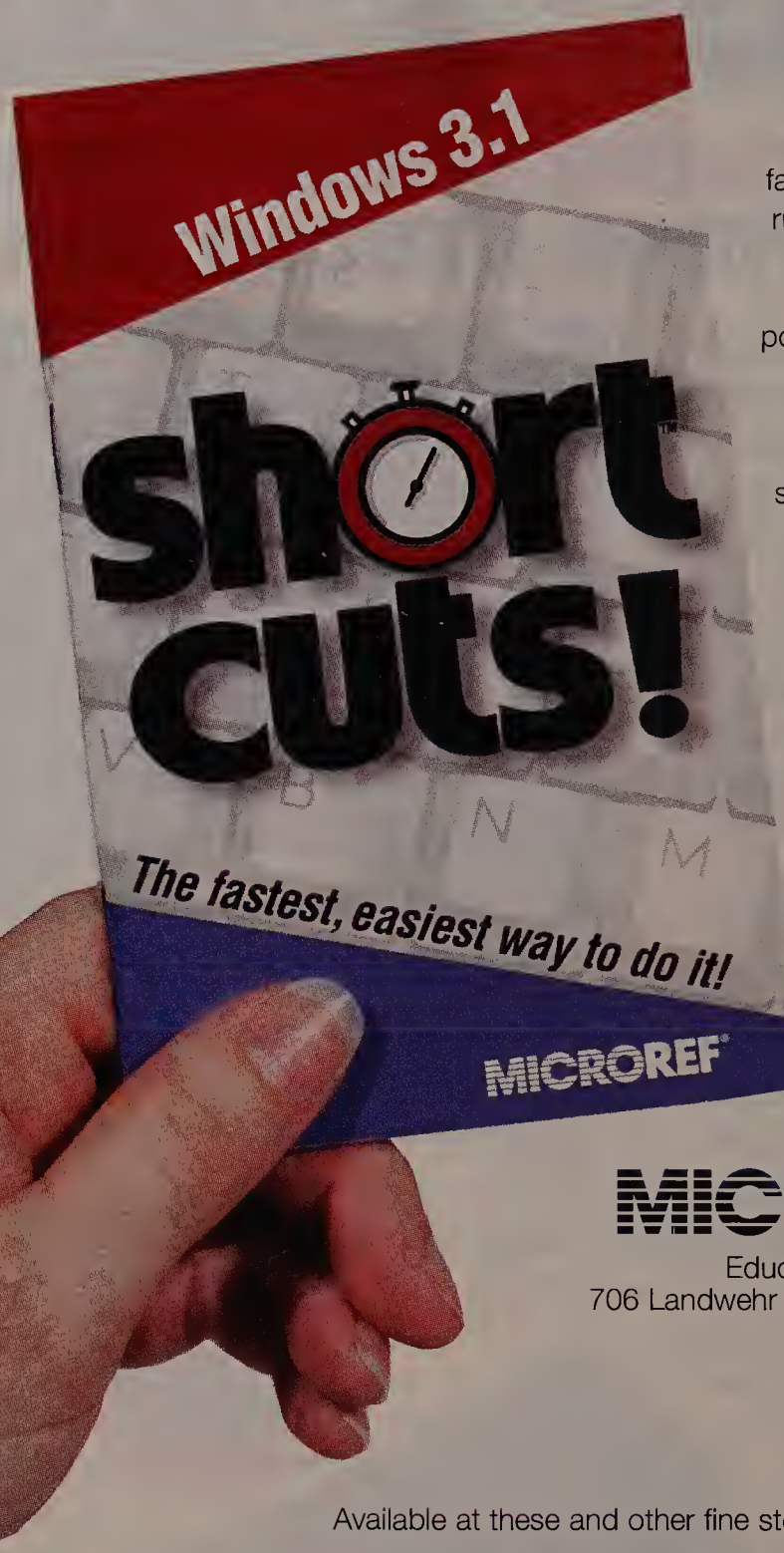

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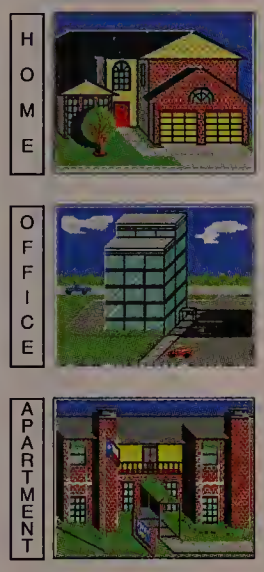

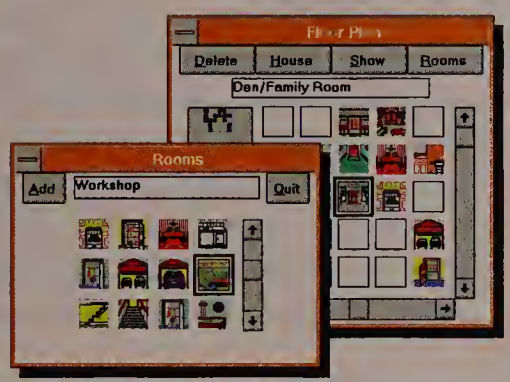

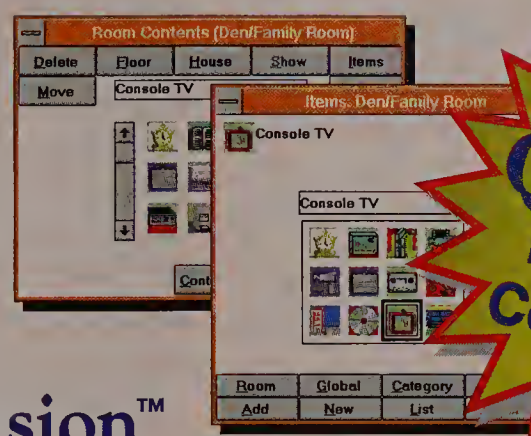

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Here's How

Contents: Spreadsheets 282 | Word Processing 286 | Windows 292

HELP LINE Q & A

Tip of the Month

UNTANGLING STRING: You'll help keep your modem running smoothly if you adjust its initialization string, found in your communications program's setup screen. At start-up, the program uses this long sequence of commands to set up your modem.

First, peruse the string. If you find the command &W, remove it. A communications program with this command in its initialization string needlessly writes to your modem's nonvolatile RAM (NRAM) every time it loads. Remove the command, and you'll avoid a little wear and tear on your modem, save a tiny bit of time when your program loads, and possibly prevent a conflict with another communications program that uses different settings.

Second, should your modem ever just blink at you when you don't have the time to look at the documentation or perform any troubleshooting, try adding the command &F after the initialization string's AT command and before any other commands. Also, if there's a Z in the string, erase it. Save these settings, exit the program, and reload it. These steps will return the modem to its factory settings.

Judy Heim, Contributing Editor

To Suss a CPU

Q I just purchased a new Pentium-based computer. When I run MSD.EXE, the system diagnostics program included with MS-DOS, it lists my system's processor as a 486DX. I called the manufacturer's technical support line, and after some confusion I was told that MSD can't detect Pentium processors. How do I know this is true, and how can I verify that the processor in my system is a Pentium?

Carmen J. Romano,
Little Falls, New Jersey

A Since most current CPUs are buried under heat sinks or fans, you can't just open the case and read the model number off the chip itself. Microsoft has remedied the problem in the latest version of MSD, 2.11, included with copies of DOS 6.22. You can also download MSD 2.11 from CompuServe (GO MICROSOFT) or from the Microsoft Download Service (206/936-6735), where you'll find it in the self-extracting archive file GA0363.EXE. There is one other way to sleuth your system's CPU, however: The ROM-based BIOS setup program built into your system board will likely identify the processor and provide a long list of other system configuration data.

Out With the Old DOS

Q When I bought my computer several years ago, it came with MS-DOS 5.0 installed. Subsequently, I upgraded to version 6.0 and, recently, to 6.2. Now I have two mysterious directories cluttering my hard disk: OLD_DOS.1 and OLD_DOS.2. Since the disk is almost full, I want to remove any unnecessary files, and these two directories together take up more than 4MB. If I delete the directories and their contents, will I encounter problems with DOS or the files in the \DOS directory?

Omar Upegui R., address unknown

A Back when you upgraded to DOS 6.0 and 6.2, the Setup program prompted you to create, label, and store an uninstall floppy. As long as you didn't subsequently run the DoubleSpace disk compression utility on your hard disk, delete DOS's hidden system files, or perform one of several other unforgivable acts of hard disk housekeeping, booting up with that uninstall disk allows you to revert to the previously installed version of DOS. But since you don't have any complaints with your current DOS, there's no point in keeping the old files around. DOS comes with a handy utility for sweeping them away. Just enter the command **DELOLDOS** at the DOS prompt—the program will whisk away both directories, and even delete itself for good measure.

To PCI or Not to PCI

Q I noted your reply to Randy D. Meek in the April *Help Line* on the subject of PCI versus VL bus. In Malaysia, PCI is offered only with Pentium systems. My dealer is offering a 66-MHz 486DX2 PC with three VL bus slots. Is that better than having the same number of PCI slots, or does it make no difference? More important, would the graphics system on this PC be future-proofed to some extent?

Hishamudin Ubaidulla,
Kuala Lumpur, Malaysia

A There's no such thing as a future-proofed system, graphics or otherwise. In fact, I've found the opposite to be true. No matter how carefully I shop,

I still end up needing some new piece of equipment whose features didn't even exist a year or two before. My office is littered with obsolete video boards and disk controllers.

Having said that, I'd venture that a 66-MHz 486 with VL bus graphics and a VL bus disk controller probably provides the most bang for your buck right now. Currently, PCI and VL bus are pretty much equivalent in throughput speed, but VL bus peripherals are still less expensive and more plentiful than PCI boards.

On the other hand, in a year or two, you may wish you owned a Pentium system, and by then they'll be less expensive. But if you currently record or play back digitized video using software compression, a Pentium may be worth the extra money today.

Deceptive DoubleSpace Driver

Q In June's *Help Line*, Larry Crosson asked if there was a way to skip the DEVICE=DBLSPACE.SYS line in his CONFIG.SYS file. You offered three complex solutions, but here is a much simpler one: If you just change the line to read DEVICE?= C:\DOS\DBLSPACE.SYS, DOS will prompt you to enter Y or N during its processing of CONFIG.SYS, determining whether or not the line is executed.

Visnu Pitiyanuvath,
Overland Park, Kansas

A You're right that adding the question mark to CONFIG.SYS commands lets you choose whether to execute a given entry. However, despite its name, DBLSPACE.SYS is not the DoubleSpace driver. The driver is actually a hidden file named DBLSPACE.BIN, which loads before DOS even gets to CONFIG.SYS (as long as DBLSPACE.BIN and a valid DBLSPACE.INI configuration file are in your boot drive's root directory). The DBLSPACE.SYS DEVICE command just moves DBLSPACE.BIN around in memory during the boot process to ensure compatibility with certain programs.

Loading DOS High With No HMA?

Q In the April *Help Line*, you responded to a question from Judith A. Nedrow, who had difficulty loading DOS high. She reported an error message about the HMA (High Memory Area) not being available when she booted her computer. You suggested she alter the HIMEM.SYS command line. I believe that your answer, while accurate, missed the real cause of the problem. Nedrow stated that her 386SX laptop had only 1MB of RAM installed. Since the HMA occupies the first 64K of RAM above the first megabyte, how can HIMEM.SYS make the HMA available when it doesn't exist?

Jeffrey Schneider, Middleton, Wisconsin

A The answer is that it does exist. Ms. Nedrow's Chaplet laptop comes with 1MB of RAM, which is made up of 640K of conventional memory and 384K of extended memory. DOS reserves addresses in the upper memory area (640K to 1024K) for use by system, video, and adapter BIOS ROMs, as well as video board memory.

Chaplet's 386SX laptops come with a CMOS utility that enables you to configure the last 384K of RAM as extended memory (with addresses starting at 1024K and, therefore, including the HMA), expanded memory (which is mapped into a 64K *page frame*, or window, in the upper memory area), or shadow RAM (which uses the addresses in the upper memory area). For those Chaplets and some other systems, it's an all-or-nothing deal—you can't use part of the 384K as shadow RAM and the rest as extended memory, for example. (Many other computers are more flexible, letting you allocate to shadowing only the RAM needed instead of all 384K.)

If you allocate all memory above 640K in a 1MB system as shadow RAM, your system's performance will improve noticeably, because system and video BIOS routines will be running from fast RAM instead of slow ROM. However, this BIOS ROM shadowing

USER GROUP OF THE MONTH

San Francisco PC Users Group

The San Francisco PC Users Group meets at 7:30 p.m. on the third Tuesday of each month at St. Mary's Cathedral, 1111 Gough St. Meetings include software and hardware demonstrations and a question-and-answer session. There are special interest groups (SIGs) for users of Word for Windows, Windows applications, and OS/2, as well as for new users, seniors, and PC professionals. The group's 28-page monthly newsletter, *Blue Notes*, features software, hardware, and book reviews; a calendar of events; and a list of volunteers available to answer technical questions. Members get access to the Internet; the SIGs; and over 650MB of shareware on the organization's four-line BBS (415/621-2609).

For more information, contact Margery Blum, president, at 3145 Geary Blvd., San Francisco, CA 94118. For a recorded message of upcoming events, call 415/346-2644. Yearly membership costs $40 for individuals, $50 for families, and $75 for businesses and includes the newsletter.

Reader service no. 820

DO AWAY WITH ABORT, RETRY, FAIL: If you try to access a floppy drive that has no disk in it, you get the error message 'Abort, Retry, Fail?'. If you usually select Fail and would prefer that DOS didn't ask, add the undocumented /F switch to the SHELL command in your CONFIG.SYS file. (If your CONFIG.SYS doesn't contain a SHELL command, simply add the line SHELL=C:\DOS\COMMAND.COM /F.)

Rick Moen
San Francisco PC Users Group

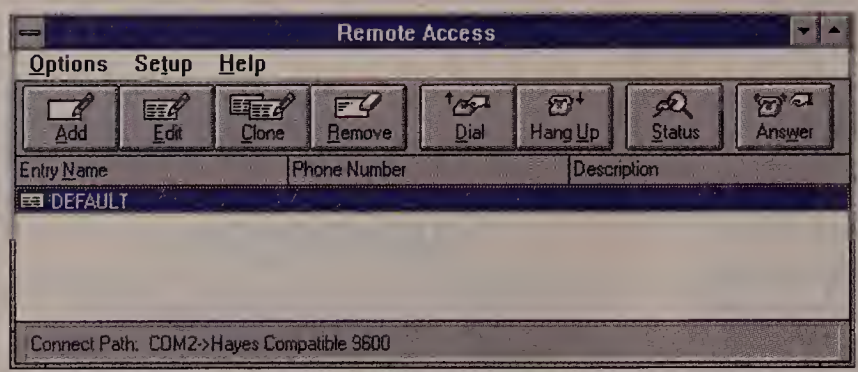

FIGURE 1: ADD SERVER CAPABILITY to Windows for Workgroups 3.11's Remote Access Services utility, and eliminate the need for Windows NT.

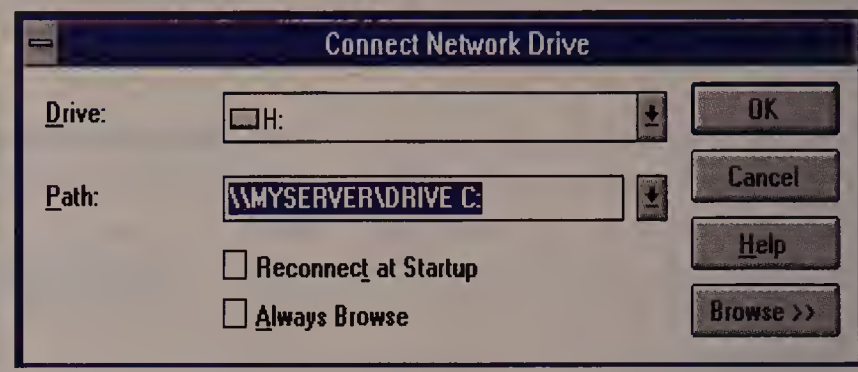

FIGURE 2: CONNECT TO RESOURCES on the RAS host system by entering the name directly; browsing over an RAS connection can take hours.

uses only a portion of the 384K above 640K; on many systems the rest will be left unused and won't be available for loading DOS or drivers high. If your system is the all-or-nothing type, you can get the most bang out of your megabyte by configuring the 384K as extended memory. You'll then be able to load DOS in the HMA, map bits of extended memory into unused addresses in the upper memory area (and load drivers into upper memory instead of conventional memory), and still shadow BIOS ROMs using DOS's EMM386.EXE or a third-party memory manager.

Remote Access for the Rest of Us

Q I'd like to set up the Windows for Workgroups Remote Access Services [RAS] server so I can dial into the net at work, but I'm finding the documentation less than adequate.

Can I set up a Windows for Workgroups PC as an RAS server, or must the host be running Windows NT? If Windows for Workgroups can be the host, is it possible to use the fax-modem on the host as a remote fax printer?
Noah Jacobs, San Francisco

A You're right—the Windows for Workgroups manual makes no mention of the RAS client software included with version 3.11. If you bought the Windows for Workgroups 3.11 Resource Kit, it offers some bad news: To dial into a Windows network using the RAS client, the host system must be running either Windows NT or Windows NT Advanced Server. NT's security minded design is incompatible with existing DOS and Windows fax programs.

Fortunately, Microsoft has released a nifty point-to-point RAS server for Windows for Workgroups. To add server capabilities to your work group, download the self-extracting archive file WFWPTP.EXE from the company's product BBS (206/936-6735), copy it to a temporary directory, execute it, and follow the README file's installation instructions carefully. Once installation is complete, your RAS software (shown in **FIGURE 1**) will have an added feature—an Answer button—and an expanded configuration dialog box that lets you turn server mode off and on, choose which COM port to answer, and set up a log-in password.

Unlike the RAS servers included with Windows NT and Windows NT Advanced Server, the Windows for Workgroups RAS host doesn't let remote callers see the network—access is limited to shared resources physically located on the RAS server itself. Thus, remote users who use RAS to dial into Bob's PC won't be able to use printers, fax devices, or files on Sheila's PC in the next cubicle—even though the person at Bob's PC can. A few other limitations are worth noting: RAS is a neat idea, but at 2400 bps it makes sense only for sending and receiving E-mail; forget about launching all but the most trivial applications from the server. RAS does support null-modem connections, so you can use it instead of MS-DOS's clunky INTERLNK and INTERSVR utilities for connecting your portable directly to your desktop system. Unlike the DOS utilities, however, RAS doesn't work over parallel links; Microsoft says this feature will be in the next version of Windows.

One last warning: After you've dialed into your RAS server, you'll still need to connect to shared resources using Windows' File Manager and Print Manager, which both provide intuitive tools for browsing networked resources. But browsing via RAS can take forever—Microsoft tech support says browsing resources with RAS might get you what you want after several hours, but there's no guarantee. Instead of browsing for the name of the resource you need to connect to, find out its network path first (in the form *\\server name\resource name*), then type the path name into the Path field in the Connect Network Drive (or Connect Network Printer) dialog box as shown in **FIGURE 2**.

Mea Culpa

Contrary to our reply in June's *Help Line* ("Technology and the Disabled"), Access Group does not provide funding for the purchase of equipment or software for the disabled, nor do the United Cerebral Palsy Association affiliates at this time have a grant from IBM to help those with disabilities acquire assistive equipment. The UCPA does have an equipment recycling program that solicits donations of used computer equipment and distributes it to families, UCPA affiliates, and other individuals in need. Access Group, a project of the UCPA, works with the disabled children of Vietnam veterans.

- **Access Group** 800/821-8580, 404/888-0505, 404/888-9098 (fax)
- **United Cerebral Palsy Association** 800/872-5827, 202/842-1266 (fax)

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World. Help Line *welcomes your questions (see page 12 for contact information).*

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SPREADSHEETS Q & A

Colorful Cell Values in Excel 5.0

Q I use Excel 5.0 to track my various projects, and I've created a Status column with entries to reflect whether a particular project is open or closed. I would like to have the color of the Status text automatically set to red when the project is labeled Open, and then when it's labeled Closed I want the cell to appear shaded gray with blue text. I've played around to some extent with cell formatting, but I have a feeling this will require a macro. Am I right?
Marion Ruff, Enon, Ohio

```
'Macro to format cell color and shading
'   based on their text contents. R. Scoville
'   PC World, 1994.
'
'1) These are the variables used in the macro:
Dim Lastcell, OpenClosed As String
'2) Establish the macro's name:
Sub CellColorChange()
'3) Store the cell pointer position so we can
'   return later:
Lastcell = ActiveCell.Address
'4) Select all filled cells near cell pointer in
'   the current column (note spaces and underscores):
Selection.Offset(ActiveCell.CurrentRegion.Row - _
ActiveCell.Row, 0).Resize(RowSize:=ActiveCell. _
CurrentRegion.Rows.Count).Select
'5) Do this for every cell in the selection:
For Each Mycell In Selection.Cells
    '6) Convert the cell contents to uppercase,
    '   and store it:
    OpenClosed = UCase(Mycell.Value)
    '7) Perform actions based on the value of
    '   the current cell:
    Select Case OpenClose
        Case "CLOSED"    '8) If the project status
            '   is "Closed,"
            '9) Change the cell's shading to gray:
            Mycell.Interior.ColorIndex = 40
            '10) And the text to blue:
            Mycell.Font.ColorIndex = 5
        Case "OPEN"     '11) If the status is "Open,"
            '12) Set the shading to clear:
            Mycell.Interior.ColorIndex = xlAutomatic
            '13) And the text to red:
            Mycell.Font.ColorIndex = 3
    End Select
    '14) Return to the cell where we started:
    Range(Lastcell).Select
Next Mycell
End Sub
```

FIGURE 1: CHANGE THE FORMATTING OF CELLS depending on their text contents with this Excel 5.0 macro.

A Trust those feelings. While you can use the *Format•Cells•Number* command to adjust the font color of a cell, depending on its numeric value, there's no corresponding trick for labels. In any case, formatting can't change the cell's shading. But the macro shown in **FIGURE 1** makes short work of your request.

Set it up by selecting *Insert•Macro•Module* and entering the macro text shown in the figure. (You can omit the lines that begin with apostrophes ['].) Then go to the sheet containing your project data, click the Status column with the Open or Closed labels, select *Tools•Macro*, and double-click *CellColorChange*. You can find COLOR.XLS, a worksheet with a sample of this macro, in the PC World forum on CompuServe and America Online.

If you want, you can create a button on the worksheet to launch the macro: Select *View•Toolbars*, and select *Visual Basic* to display the macro tool bar. Click the Create Button tool (shown to the right), drag to create the button, select *CellColorChange* from the list, and click *OK*. Name the button as you wish, click away from the button to deselect it, and you're ready to go: Just click the button to set your status colors.

The macro automatically selects all the filled cells near the cell pointer in the current column (it stops selecting when it reaches a gap), then it examines each cell. If a cell contains the word 'Closed', the macro sets the cell shading to color number 40 and the text to color number 5 (see statements 9 and 10 in Figure 1). To decode the color numbers, select *Tools•Options•Color* and count off the blocks you see in the color palette: The 5th block is blue, the 40th is light gray, and so on.

The tricky part of the macro is statement 4, which selects only the filled cells in the current column. Here's the way it works: ActiveCell.CurrentRegion.Row - _ActiveCell.Row calculates the difference between the row number at the top of the block of occupied cells surrounding the cell pointer (CurrentRegion) and the row number where the cell pointer is located. The Offset method uses that negative number to determine the address of the top cell in the column. Next, the Resize method calculates a range that begins with that cell and has the same numbers of rows as the current region. Finally, the Select method selects that range.

Selecting the Current Column With an Excel 5.0 Macro

Q I've had success in writing Excel 5.0 macros, but now I'm stumped: I want a macro that selects just the filled cells near the cell pointer in the current column. For example, if there are entries in cells A3:D14, and the cell pointer is in C7, I want the macro to select cells C3:C14. Is this possible?
Bob Timberlake, Bar Harbor, Maine

A It certainly is. In fact, it's part of the macro I wrote to answer the previous question. Check out macro statement 4 in Figure 1; you can put it in any macro to achieve the desired results.

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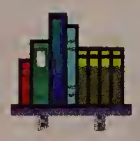

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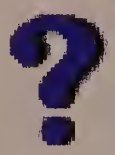

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Master Class: Better Spreadsheet Design

In last month's Master Class, I discussed design guidelines that make your spreadsheets easy (well, easier) for other people to understand. This month, in response to a reader's suggestion, I want to flesh out one of the most important of those principles: separating data entry and reports into distinct work areas. The example discussed here was built using Quattro Pro 5.0 for Windows, but the methods described work with any spreadsheet.

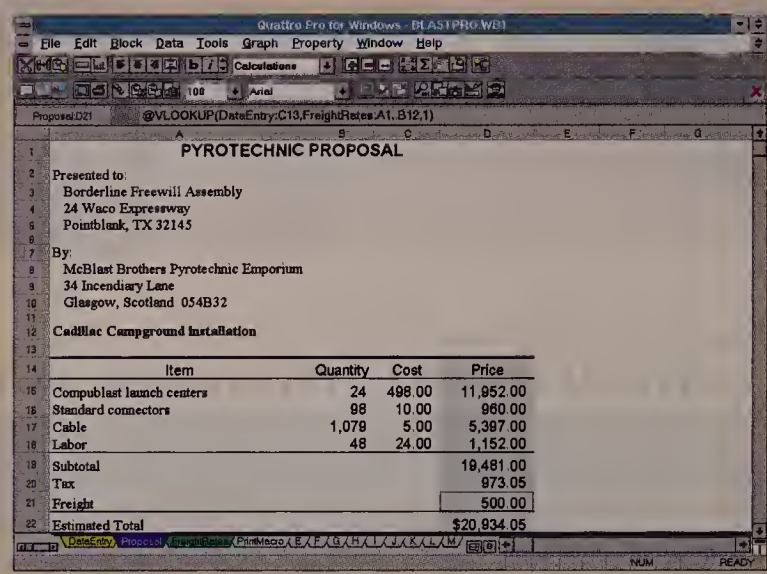
Let's assume you're the spreadsheet guru for the McBlast Brothers Pyrotechnic Emporium ("makers of popular fireworks since 1488"). Part of your job is to build a spreadsheet template to help the firm's telemarketers prepare customized proposals for a new product, the PC-driven Compublast fireworks management system. Your first attempt at the template consisted of a single sheet, similar to the Proposal sheet in FIGURE 1. But you found that, despite written instructions, many questions and misunderstandings about filling in the form arose, and too many typos and other errors occurred. For instance, in their zeal to close a deal, many salespeople quoted below-cost prices for the launch centers.

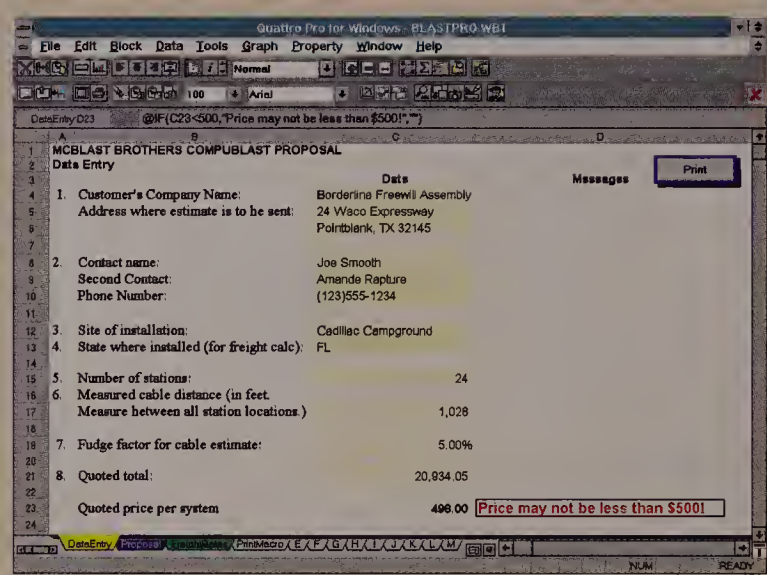
The solution is a separate data entry sheet (FIGURE 2) linked to the proposal report in Figure 1 with simple formulas. The data sheet is designed to make entering data as easy and unambiguous as possible. The items in the data area are arranged in a single column (C) in the order most convenient for typing, and the text in column B provides helpful instructions on entering the data. Special verification formulas, like the one shown in cell D23, can alert the operator to erroneous entries before they cause problems.

After entering the data in the DataEntry sheet shown in Figure 2, the salesperson executes a macro (via the Print button) that prints the report in Figure 1, which is located on a separate page of the workbook. The report doesn't contain any data entry cells; all its numbers are formulas. For instance, the formula in cell B15 is +DataEntry:C15, which simply fetches the quantity of launch centers from the corresponding cell on the data sheet.

In other cases, the data entry values get massaged on their way into the report. For example, the measured cable distance in DataEntry:C17 is 1028; the formula +DataEntry:C17*(1+DataEntry:C19) in Proposal:B17 increases that estimate by the 5 percent fudge factor shown in DataEntry:C19, for a total cable distance of 1079 in the Proposal sheet. Similarly, the freight rate shown in Proposal:D21 is retrieved via an @VLOOKUP function from a table (not shown) on the third page of the workbook; the rate is based on which state is entered in DataEntry:C13.

Separating data entry areas from reports isn't a complicated process, and it makes entering data and generating reports much easier for harried telemarketers.





SEPARATE DATA ENTRY AND REPORTING TASKS onto separate workbook pages to decrease confusion. FIGURE 1 (top) is a report generated from data entered in data entry sheets like the one shown in FIGURE 2 (bottom). The sheet in Figure 2 is designed to accept sales data in the order received.

Column Headings in 1-2-3 Reports

Q In my work as an accountant, I often create 1-2-3 worksheets with columns that wind up several pages long. When it comes time to print out the worksheet, I would like to be able to see the column headings on every page. Is there an easy way to do this?

G. Vaughan Parker,
Santa Barbara, California

A Yes, though the commands vary depending upon whether you're using regular print commands or Wysiwyg. Let's say your labels are in row 1: Put the cell pointer in row 1 and select */Print•Printer•Options•Borders•Rows* (if you need more than one row repeated at the top of each page, select the rows here), then press **<Enter>**. If you're using Wysiwyg, select *:Print•Layout•Borders•Top*, select the appropriate rows, and press **<Enter>**. Now 1-2-3 repeats column headings on each page.

By Richard Scoville

PC World contributing editor Richard Scoville is a software training consultant in Chapel Hill, North Carolina. Spreadsheets *welcomes your questions (see page 12 for contact information).*

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WORD PROCESSING Q & A

Creating Trifold Brochures

Q Lately I've been deluged with fliers from companies like Paper Direct that are selling paper stock imprinted with fancy color designs. The idea is, I can get color backgrounds and borders on brochures and other print jobs without a color printer. These papers are enticing, but I'm not sure how to go about creating such a brochure. I use both Word for Windows and Ami Pro for word processing. Can I use these programs for laying out three-panel brochures? Do you have any general design suggestions?
Martha Honneger, Detroit

A I'm glad you asked this question, because I've been experimenting with these preprinted papers myself and have found they make brochures and fliers look really slick. With a Windows word processor, it's not all that tough to create layouts to fit the paper designs. Rather than giving you step-by-step instructions for a specific program, I'll offer some general layout techniques you can use with any word processor. All you need are some samples of the preprinted paper, a ruler, and a good working knowledge of the program you'll be using.

First set up your word processor. Start with a blank document on the screen. Use your program's page-layout dialog box to switch paper orientation from portrait to landscape. Next, set the overall page margins to allow for the preprinted borders on your selected paper, then allow another ¼ inch or so of white space inside these borders to avoid a crowded look. Finally, set up the page in three columns, making the gutter between columns twice as wide as the left and right margins.

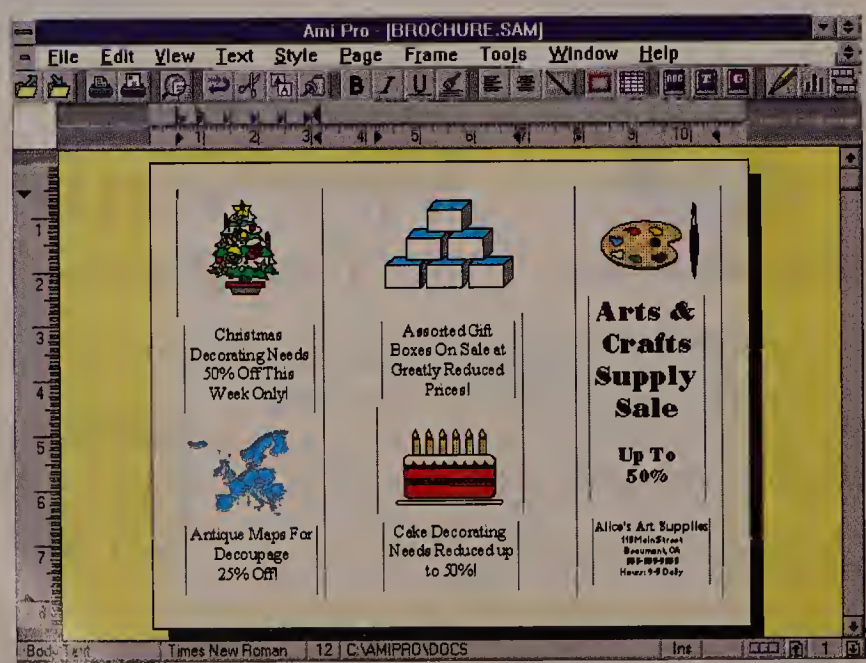
Next figure out your design. Fold one of the sheets of paper in thirds (the way that it will be folded when the brochure is printed) and sketch a rough design on it. You don't need to write all the text, but block out titles and draw boxes where you want graphics, body text, and other elements to appear. Take your time with this step, and aim for a logical, balanced layout with plenty of white space.

Now you're ready to lay out the design in your word processor. The key here is to create boxes with your program's frame or box tools for each element you blocked out on paper. It helps to work in full-page view when you're doing this, so check your word processor's view menu for the appropriate command. Lay out one side of the brochure, then the other, using your sketched layout as a guide.

Switch back to normal editing view (or even an enlarged view) to enter and lay out your text or import graphic images. Use your program's text-alignment tools, and don't forget special formatting (such as bulleted lists) to add punch to your layout. Don't go overboard with fonts, though; stick to one or two typefaces in different sizes and weights.

When you're done with the layout and editing, print a few samples on plain paper. Hold them up to the light in front of the preprinted paper stock to make sure your layout aligns with the paper's designs. Try folding the samples in thirds to make sure your design works with the folds. Finally, print a sample on the preprinted paper and give it a final going-over before printing in quantity. If your printer can't handle duplex printing, make sure you print both sides of this last sample page (by sending it through the printer twice) to check for proper alignment.

Don't be afraid to experiment with your design, and don't commit to printing an entire run until you're satisfied with the look of your brochure.



CREATE AN ATTRACTIVE DOCUMENT with a Windows word processor, then print it on preprinted paper for a professional look.

Inserting Bullet Characters in Word 6.0

Q I know how to use the bulleted-list icon in Word 6.0 for Windows, but often I just want to insert a single bullet in my text. At home I use Word for the Macintosh, and pressing <Option>-8 inserts a bullet character. Is there an equivalent command in WinWord?
Eric Jameson, Arlington, Virginia

A While WinWord doesn't come with a built-in keystroke for inserting a bullet, it's easy to create one. Select *Insert•Symbol* to display the Symbol dialog box. Locate the bullet character in the grid, then click it once to select it. Then click *Shortcut Key* to call up the Keyboard dialog box. By default, the cursor will be in the *Press New Shortcut Key* area, so just press the key combination you want to use to insert your bullets. Because you are used to the <Option>-8 combination, I'd suggest that you use **<Ctrl>-8**—WinWord doesn't normally assign it to anything. To finish the job, click *Assign*, then *Close*. Back in the Symbol dialog box, select *Close* once more, and you're done.

Incidentally, you can follow the same procedure to assign keystrokes to any special character. If you discover that you need nonkeyboard characters frequently, why not assign shortcut keystrokes to them as well?

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Reading WinWord 6.0 Documents in WinWord 2.0

Q Some people at my office use Word 6.0 for Windows, and others (like me) who have older hardware use Word 2.0c. Those of us who are using Word 2.0c can't load documents created with version 6.0. While the 6.0 users could save their documents in the 2.0 format, that's inconvenient. Is there any way version 2.0 will read documents created in the newer version of WinWord?
Alice Vanderbilt, Seattle

A Fortunately, Microsoft created an import/export converter for WinWord 2.0. This little utility kicks in automatically when you open a document created in version 6.0 and lets you both load and save documents in the newer file format. The converter can't translate everything—it can't handle document elements created with any of version 6.0's new features, such as OLE 2.0 links—but otherwise it's an excellent solution to your problem.

You can download the self-extracting archive file MSWRD6.EXE from the Microsoft Word forum on CompuServe (GO MSWORD) or from Microsoft's direct download BBS at 206/936-6735. You can also find the file on PC World Online on America Online (keyword: PCWORLD) as well as on CompuServe (GO PCWORLD). Copy the file into an empty directory on your hard disk, then expand it by typing **MSWORD6** at the DOS prompt. A file in the archive, README.TXT, contains complete instructions for installing the converter. MSWRD6.EXE is also available on disk, at no charge, directly from Microsoft. If you're a registered Word owner, you can request a copy by telephoning Microsoft Sales at 800/426-9400.

Restarting WinWord 6.0's Tips of the Day

Q I enjoyed the Tip of the Day feature when I first upgraded to WinWord 6.0, but I soon turned it off when it became a nuisance. Now that I'm getting deeper into the program, I find I could use those tips again. How do I turn them back on?.
Jeff Schwitters, Rochester Hills, Michigan

A This one's easy. Select *Help•Tip of the Day;* when the Tip of the Day dialog box pops up, mark the *Show Tips at Startup* check box. From then on, you'll get a tip whenever you fire up WinWord, including my favorite: 'Plaid shirts and striped pants rarely make a positive fashion statement'.

Amazing Disappearing Graphics in WordPerfect

Q I recently received the 6.0a interim release of WordPerfect for Windows. It fixed many problems but introduced a new one. While editing a document containing a graphic, I deleted a block of text, and the graphic disappeared too. I immediately selected Edit•Undo, which brought the graphic back, but whenever I selected and deleted text in the same area, the image vanished again. Why is this happening, and is there a solution?
Alex Saunders, Bloomington, Minnesota

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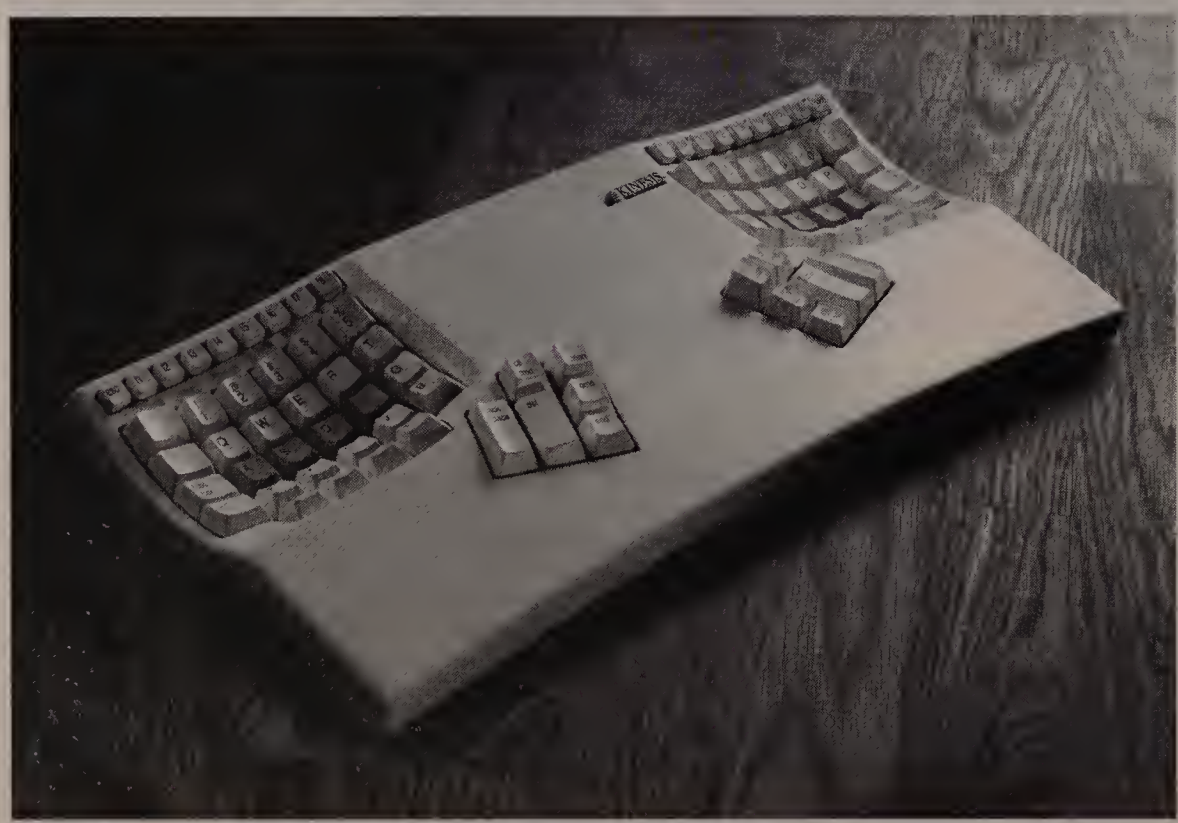

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A When you insert a graphic in a document, WordPerfect places a box code in the file to mark the location of the graphic. That's how it's always worked. But in version 6.0a, if you select and delete a block of text surrounding a box code, the code is deleted along with the text. Regardless of how you position the graphic, even if you anchor it to a character, a paragraph, or a page, it disappears if its box code is in the midst of the text you deleted. By the way, the same thing happens with custom, equation, and text boxes.

My contacts at WordPerfect confirm this bug exists. The company is working on another interim release, which should include a fix for this annoying problem, but it hasn't announced a release date yet.

In the meantime, the best way for you to preserve box codes when deleting blocks of text is to open the Reveal Codes window by selecting *View•Reveal Codes* or by pressing **<Alt>-<F3>**. With Reveal Codes turned on, you are able to see the box codes in your text and avoid them when you make your selections.

If you still accidentally delete a box code, immediately select *Edit•Undo* or press **<Ctrl>-Z** to get it back. Be sure you undo the unwanted deletion before you delete any other text, or you'll have to insert the graphic again from scratch.

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More Ways to Count Words in Ami Pro

Q In your April column, you advised a reader to use Ami Pro's File•Doc Info command to get a word count for a document ["Word Counting in Ami Pro"]. While this technique works, it seems unnecessarily complicated. Why didn't you recommend using the WORDCNT.SMM macro supplied with the program?

Paul G. Cantrell, Eugene, Oregon

A You caught me on that one. This word-counting macro supplied with Ami Pro 3.0 works really well and lets you know the page count and file size to boot. Here's how to use it: To get the facts about your current document, select *Tools•Macros•Playback*, then choose *WORDCNT.SMM* from the Macros list and click *OK*. The macro should be in the \AMIPRO\MACROS subdirectory; if you don't find it, run the Ami Pro installation program again to install the included macros.

If you need to perform word counts frequently, I'd advise assigning this macro to a shortcut keystroke. Since Ami Pro uses many of the letter keys in its own default key combinations, I specified **<Ctrl>-1** for the word-count macro. To do this yourself, select *Tools•Macros•Playback* and *WORDCNT.SMM* as you did before, then click inside the 'Playback shortcut keys' text box and press **<Ctrl>-1** (or whichever keystroke you prefer). Click *OK* to run the macro and store the shortcut.

By George Campbell

George Campbell is a contributing editor for PC World. Word Processing Q&A *welcomes your questions (see page 12 for contact information).*

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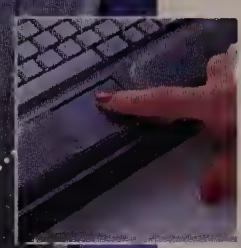

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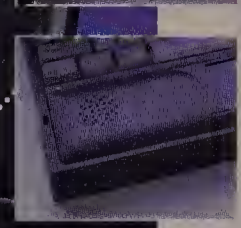

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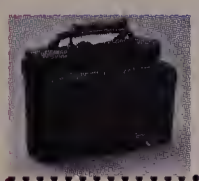

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WINDOWS Q & A

Adding Menus to File Manager—The Sequel

Q Your tip in the May issue on adding a custom menu to Windows' File Manager by editing MSTOOLS.DLL worked great for me ["Adding Menus to File Manager"], but I went one step further: Using the same basic technique, I changed the text that appears on the status bar in File Manager when I select an entry on the custom menu. Now, when I select a program I added to the menu, the status bar reminds me what the program is for, just as it does for Microsoft's original menu choices. This annotation is especially useful considering how little space the menu allows for program names.
Dennis P. O'Connell, Brooklyn

A Thanks for the pointer. To reiterate the May tip, you can customize File Manager's Tools menu by editing the file MSTOOLS.DLL. First you create a back-up copy of the file by copying it to another directory and giving it another name. Then you edit this copied file in Windows Write and add the appropriate reference in WINFILE.INI to get your customized menu to appear in File Manager. (Complete details appear on page 248 of the May issue.)

Reader O'Connell takes this procedure one step further. His trick is to search MSTOOLS.DLL for the text 'Run Microsoft Backup for Windows' and replace it with text of *exactly the same number of characters* (including spaces) describing the program he's using to replace Microsoft Backup. Then O'Connell searches for the text 'Run Microsoft Antivirus for Windows' and replaces it with descriptive text (of precisely the same number of characters) for the program that he is using in place of Microsoft Antivirus. The descriptive text then appears in the status bar at the bottom of the File Manager window whenever O'Connell selects one of the new commands that he's added.

Windows Toolbox

Want more oomph from Program Manager? WinWear's WindowMagic 3.0 enhances Program Manager without replacing it. With WindowMagic installed, you can designate one application per group as your favorite and then launch it by double-clicking the group with the right mouse button. WindowMagic also puts an icon, along with the date and time, next to the control button on your active app's title bar. From this icon, you can quick-launch your favorite apps, switch between running tasks, and use WindowMagic's own utilities. For good measure, the program comes with a resource monitor, a printer icon for drag-and-drop printing, and an enhanced Run command. The suggested retail price is $89.95, but until December 10, you can have the package for $49.95. It's available from WinWear (800/803-9358, 206/635-0856). Reader service no. 606

Locking Control Panel

Q I supervise the use of computers in a public library. Patrons frequently mess around with the Windows color schemes by opening Control Panel and then changing the settings in the Color module. These modified color schemes will sometimes make it difficult for others to read the screen. Is there any way I can keep people from changing the screen colors in Control Panel?
Caroline Cooper, Lansing, Michigan

A To suppress individual icons selectively in Control Panel, you need to edit the CONTROL.INI file in your Windows directory. Here's what to do:

In either File Manager or Program Manager, choose *File•Run*, type **CONTROL.INI**, and click *OK*. When the file opens in your text editor, type a new line at the beginning that reads **[Don't Load]**. Underneath this heading, add a line that starts with the name of the icon you want to hide (open Control Panel to get the exact spelling of the icon's name), followed by an equal sign and then any text at all. For example, to hide the Color icon, add a line that reads **Color=no way.**

The next time that you start Control Panel, you won't see the Color icon. And don't worry—this technique will also remove 'Color' from the Control Panel's Settings menu.

True Color, False Color

Q I'd like to take a frame from an AVI video file and save it as a BMP file for later use. I've tried using the <Print Screen> key to capture the screen to the Clipboard and then paste it into Paintbrush. But when I save the Paintbrush file, the picture becomes unusable. Is there a workable way to do this?
Chris Bailey, Carthage, Missouri

A When you copy AVI images from Windows' Media Player to the Clipboard, the information comes in as 24-bit color and can potentially include up to 16.8 million colors. But if you try to copy these images while using an 8-bit (256-color) video driver, the image's colors won't display correctly. Trying to paste the image into Paintbrush and then saving it as a 256-color BMP image won't work either, because Paintbrush doesn't support *dithering*—the mixing

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of a limited range of colors to approximate colors outside that range.

Seems to me you have three possible solutions. Solution number one: Tell Media Player to dither your image to 16 colors. Start by opening the AVI file that you want in Media Player. Choose *Edit•Options* and check *Dither picture to VGA colors*. Click *OK* and start playing the AVI file. When you get to the frame you want to capture, select *Edit•Copy Object;* then open Paintbrush and choose *Edit•Paste*. With the pasted image still selected, choose *Edit•Copy to*. Type in a name for your file, and under Save File as Type, select *PCX files (*.PCX)* or *16 Color bitmap (*.BMP)*.

If the resulting 16-color version isn't good enough for you, try solution number two: Switch your display to show more colors. First, find out if your video hardware supports 16-bit or 24-bit color; most graphics adapters sold these days can do 16-bit color, at least in low resolutions. Consult your graphics board's manual for instructions on switching to one of these higher-color modes. In some cases, it's as easy as starting Windows Setup, choosing *Options•Change System Settings*, specifying a new driver for Display, then clicking *OK* and letting Setup restart Windows. In other cases, you'll use a Windows utility that came with your graphics board to change the color depth.

However you do it, once you're running Windows in a high-color mode, open your AVI file in Media Player and start playing it. When you get to the frame you want, use *Edit•Copy Object* to copy it to the Clipboard. Paste it into Paintbrush as before, then choose *Edit•Copy To* and specify a file name. Select *24-bit bitmap (*.BMP)* under Save File as Type. To finish, click *OK*. The downside of the second solution is that your image will occupy a large amount of disk space, waste memory when used as Windows wallpaper, and display properly only in this higher-color mode.

If these limitations bother you, move on to solution number three: Dither the image. This means you first have to capture the image in Media Player, following the same steps outlined in the first two solutions. Then, instead of pasting the image into Paintbrush, paste it into a screen-capture or image-editing program that supports dithering. Many image editors (including the shareware program PaintShop Pro) can do the job. Once you've pasted the image into the editor, save it to a file, specifying a 256-color file format.

Home Alone with Schedule+

Q I run Windows for Workgroups 3.11 on a stand-alone PC in my home office and use Schedule+ to keep track of appointments. Every time I start Schedule+, it asks me whether or not I want to work offline. Since my PC is never connected to a network, my answer is always No. I hate having to answer this question every day. Is there some way I can let Schedule+ know that I'm *never* on a network?
Pat Biggs, Vancouver, Washington

A Just start Schedule+ and choose *General Options* from the Options menu. Check the *Startup Offline* box at the top of the dialog box and click *OK*. You'll never be bothered by those pesky questions again. ▶

COMING UP

The Ultimate Upgrade Guide

Wish you had a 486 or Pentium, but can't afford a new system? Adding memory, upgrading the CPU, and installing a better graphics card are just some of the lower-cost options to explore. Here's just how much hardware bang you can get for your buck.

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Circle 213 on reader service card

Remote Printing

Q I have a copy of CorelDraw 3.0 on my home computer and use the program to prepare presentations. I'd like to print these Corel jobs on the laser at work, but I don't have a copy of the program at the office. Is there any way to take graphics I create in Corel at home and print them up at work?
Michael Triola, PC World Online

A This problem comes up in all kinds of applications, not just in CorelDraw. If you simply want to print a picture and don't care about editing it at the office, you can print it to a file and then copy that file to your printer at work.

Here's how to do it in CorelDraw; the steps are much the same whatever Windows app you're using: Open the picture in CorelDraw and choose *File•Print*. Select the print settings you want, and check *Print to File*. Then click *OK* and specify a file name and location for the print file (by default, CorelDraw uses the file extension PRN). Set any remaining printer-specific options and click *OK* again. CorelDraw will create a print file of your picture.

Note: If you want to do this with an app that doesn't have a Print to File option, launch Windows' Control Panel, double-click the *Printers* icon, click *Connect*, and select *FILE:* from the Ports list. Click *OK*, then click *Close*. Next time you print, you'll be prompted for a file name, and the data will go to the file instead of to your printer.

Copy the file to a floppy, take the disk to work, and copy the file onto your office PC. In File Manager, select the name of your print file and choose *Copy* from the File menu. In the 'To text' box, type **LPT1** (or whichever port your office printer is connected to). If File Manager asks if you want to overwrite an existing file, click *OK*. Your picture should emerge from the printer.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).* Windows Q&A *welcomes your questions (see page 12 for contact information).*

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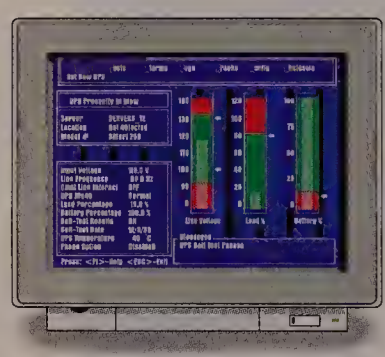

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USER GROUP TIP

Faster Loading in Windows for Workgroups

I upgraded to Windows for Workgroups to take advantage of 32-bit file access. While my computer's performance increased, loading and unloading Windows took longer because Windows looks for network connections, which I don't have on my stand-alone PC. By adding /N (for "no network") after the WIN command line, I told Windows not to bother looking for the connections. It now loads—and unloads—much faster.

Susan Klum
San Francisco PC Users Group

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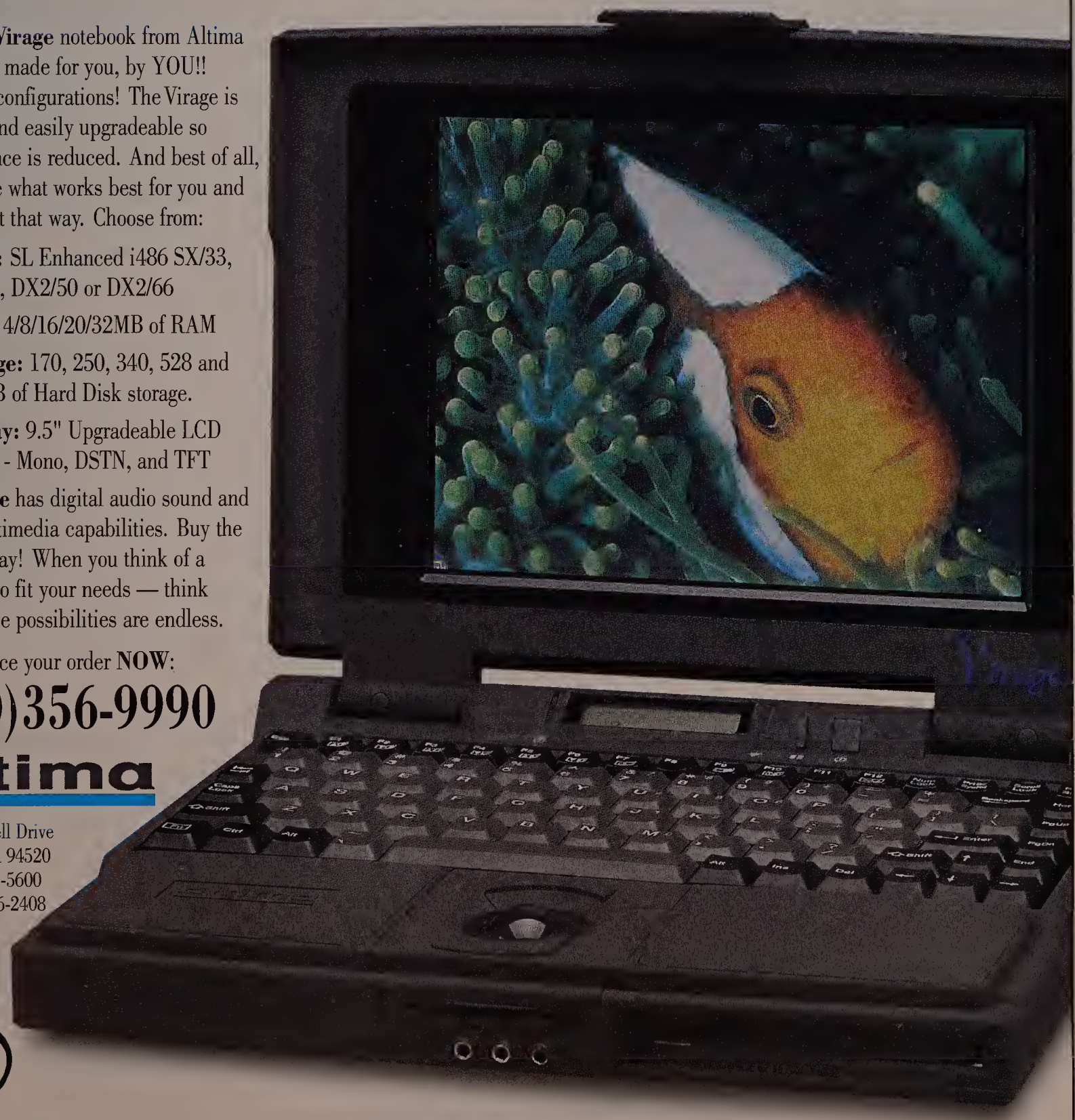

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Circle 27 on reader service card

DATA MANAGEMENT Q & A

Show Multiple Tables in an Access Form

Q I'm setting up an invoice system in Access 2.0, and I used the Table Wizard to create tables for Customers, Orders, Order Details, and Products. So far so good. But now I can't design a form for entering information in all four tables at the same time. Through the Form Wizards, I created a form with a subform that brings Orders and Order Details together, but I also need fields from the Customers and Products tables. How can I include data from all four tables on the form?
Kelly McCarthy,
Woodland Hills, California

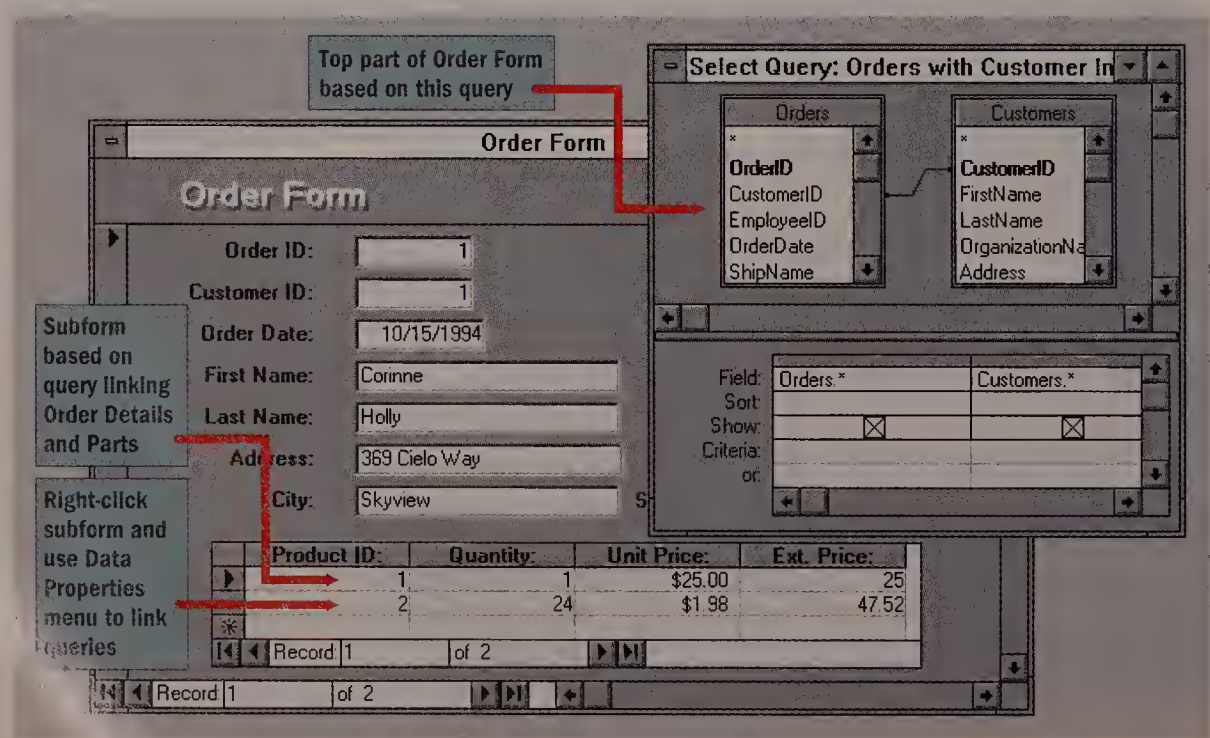
A The trick is to base your form and subform on queries instead of tables. You'll need to create two queries before you start your new form—one for Orders and Customers and another for Order Details and Products.

I'm assuming that when you created your tables, you allowed the Table Wizard to define relationships between them. If you didn't, go to the Database window and use *Edit•Relationships* to link Orders and Customers on the CustomerID field, and Order Details and Products using the ProductID field.

With these relationships in place, you can create the needed queries. Open a new query—without using the Wizard—and add the Orders and Customers tables to the Query window. If your tables are related correctly, you'll see a line connecting both tables' CustomerID fields. Click the asterisk (*) under Orders, and drag it into the Field box in the first column in the bottom half of the query window. Then drag the asterisk under Customers into the second column's Field box in the same way. Close the query and save it as **Orders with Customer Information**. Go through the same process to create a query linking Order Details and Products, saving it as **Order Details with Product Information**.

Now create your form. After clicking the *Form* tab and the *New* button, select *Orders with Customer Information* for your Table/Query, and click *Form Wizards*. Select *Main•Subform* as your Wizard, and the query *Order Details with Product Information* for the subform. As you navigate the Wizard, make needed content and design decisions .

At one point, the Form Wizard will tell you that it can't link the main form and subform; click *OK*—you'll have to do this job manually. Bring up the new form in Design mode and right-click the subform area. Select *Properties•Data Properties*, and in the dialog box enter **OrderID** for Link Child Fields and Link Master Fields. When you close the box and leave Design mode, all four tables will be linked in the form.



TO LINK ACCESS TABLES in a form, create two queries and combine them into one Main/Subform.

USER GROUP TIP

FoxPro Right-Clicks

To save time when you access a command history or browse through data in FoxPro for Windows, enable the right mouse button. In the command window, just type on key label rightmouse keyboard chr(13). This makes the mouse button work like the <Enter> key.

Butler Crittenden
San Francisco PC Users Group

Sum Summaries in an Approach Report

Q I am using Approach 2.1 to set up summary reports of expense information. I want to print my EXPENSES file's data grouped by the Type field, with subtotals for each group. I've created a report with a summary panel that groups the records by Type, and I've placed a calculated field with the formula 'Amount' in that panel. And yes, I've set it to summarize on 'Trailing summaries of groups sorted on EXPENSES.Type'. But it always shows the amount from the last record in the group instead of the group total.
Sam Green, Seattle

A Simply put, your formula is wrong. Just change it to **SSUM(Amount)** (or to **SSUM(EXPENSES.Amount)** if your report uses more than one data file), and your problem will be solved.

And now a little more detail for readers who need it. To add a summary panel to a report, go into Design mode and select *Design•Add Summary*. In the resulting dialog box, select *A Group Sorted On* and the field you want to group data by, then click *OK*. This will create a new panel below the one that contains your fields.

To create a calculated field, click the

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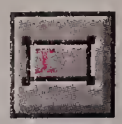


Draw field button and draw a rectangle in the new summary panel. In the resulting dialog box, click *Field Definition* to bring up a second dialog box. In that dialog's Name text box, enter a name for your new calculated field, and for Type select *Calculated*. In the resulting dialog box, enter a formula like the one I described earlier.

Selective Subtotals in Paradox for DOS

Q I use Paradox 3.5 in my service and retail sales business. I've made several attempts to create an invoice report that shows products (which are taxable) and labor (which is not). Is there a way to subtotal these groups and show only the tax computation for the taxable items?
Dean Malsom, CompuServe

A Here's the only solution I know for Paradox 3.5 and the best one for Paradox 4.*x*. I'm assuming the goods and services that may or may not be taxable are in a table called LINEITEM, and that you're marking an item as taxable with a one-character alphanumeric field called Taxable. If a line item is taxable, that field contains Y; if not, N. If my assumptions are off, adjust the following instructions to match your database.

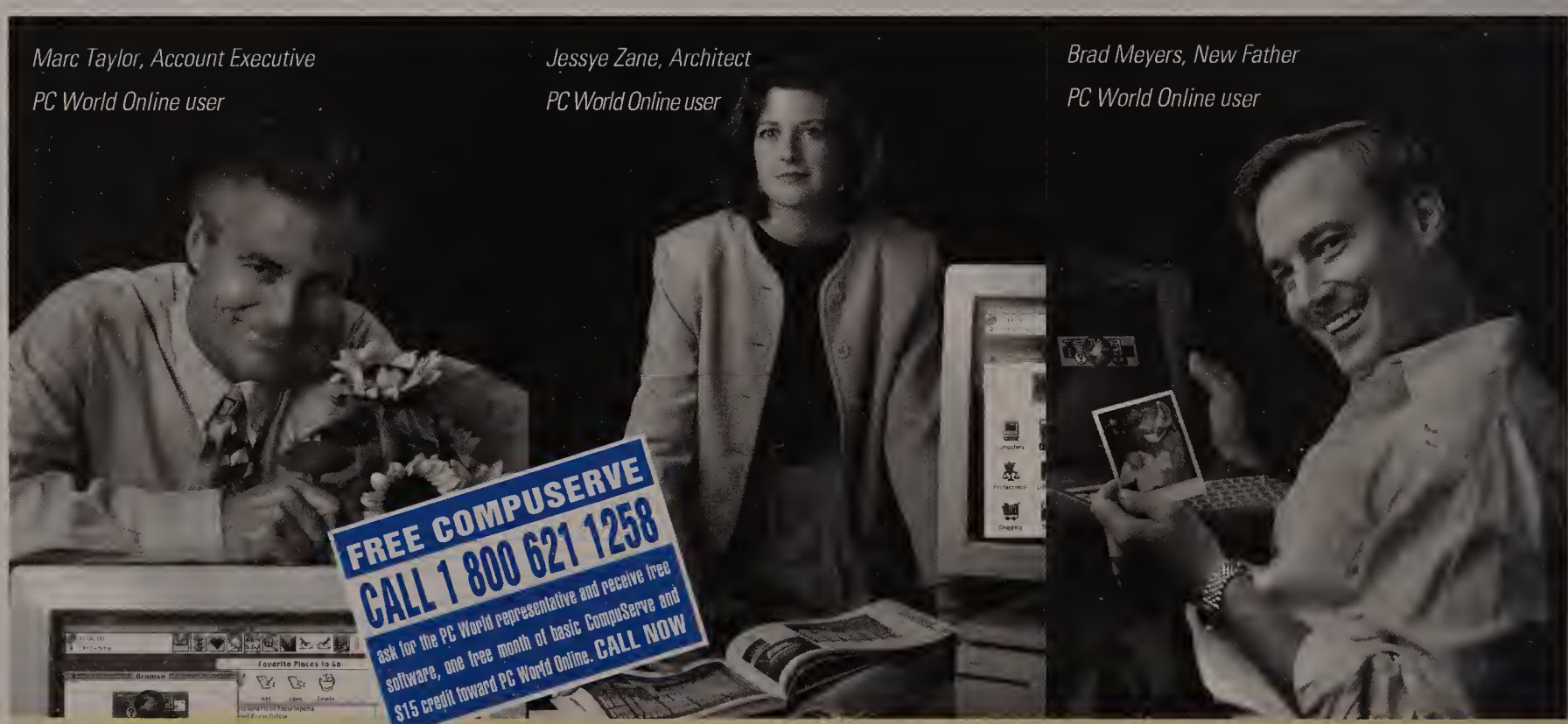
First add a numeric field called Tax Rate to the LINEITEM table. Then create a new table called TAXRATES with its own Taxable and Tax Rate fields. Make Taxable the first field in this table, and enter its type as **A1*** to make it the key field. After you create TAXRATES, add two records to it, one where Taxable contains **Y** and Tax Rate is your actual tax rate, and one where Taxable is **N** and Tax Rate is **0**. Remember that tax rate is expressed as a percentage; if your state has an 8 percent tax rate, enter **.08**.

Now you need to add a table lookup to the Taxable field in LINEITEM so that Paradox will fill in the tax rate when you enter invoice information. View your LINEITEM table and press **<F9>** to enter edit mode. Select *Valcheck•Define*, move the cursor to the Taxable field, press **<Enter>**, and select *TableLookup*. Enter **taxrates** as the lookup table, and choose *AllCorresponding-Fields•FillNoHelp*. Although Paradox fills in the default tax rate automatically, you have the option to overwrite it should complications demand.

Finally, you must modify your invoice report, designed around LINEITEM, to use these new fields. With the report open, use *Group•Insert•Field•Taxable* to add a group to the report based on the Taxable field. Place a calculated field in the group footer to show the subtotals for nontaxable and taxable items (for example, the field **Sum([Qty] * [Price],group)**). In the report footer, add calculated fields to show the total tax amount and the overall total. The expression for the taxes should look like **Sum([Qty] * [Price] * [Tax Rate],group)**, with your own field names for Qty and Price. The expression for the overall total should be **Sum([Qty] * [Price]+[Qty] * [Price] * [Tax Rate],group)**.

By Celeste Robinson

PC World *contributing editor Celeste Robinson is author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).* Data Management *welcomes your questions* *(see page 12 for contact information).* ■



At 5 pm, Marc Taylor evaluated twelve new software packages, read the latest electronic news, received expert advice on three technical questions, sent mail to 100 potential clients and still had time to buy flowers for a 7pm date.

Before dinner Jessye Zane, who is very particular about aesthetics,took a moment to admire our windows.

And after a long night's work, Brad Meyers took a few minutes to let two hundred associates know that Joshua Mark weighed 8lbs. 7oz.

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PUBLISHING & PRESENTATIONS Q & A

Animating Freelance Screen Shows

Q I'd like to pep up some charts in a screen show I created with release 2.01 of Freelance Graphics for Windows. I'm looking for something fancier than the program's automated chart-building sequences, but nothing as extravagant as motion video or sound. Any suggestions besides varying the transitions between slides? How about animation?

Karen Rosebush,
Pepperell, Massachusetts

A Freelance doesn't have the full-fledged animation features you'll find in programs like Gold Disk's Astound or Macromedia's Action. It does, however, have some text transition effects—Text Top, Text Bottom, Text Left, and Text Right—that you can use to add motion to the text labels on your charts. Here's how to do it:

1. Begin with your presentation in Current Page view (if necessary, select *View•Current Page*) and go to a page containing the chart you want to work on. Use the Selector tool to select the data chart (Freelance shows that the chart is selected by surrounding it with small boxes).

2. Select *Arrange•Ungroup* to break the chart into individual objects, then click *OK* in the resulting dialog box. If the chart is positioned over a 'Click here...' placement block, Freelance tells you to drag the chart away before you can ungroup it. If this happens, just move the chart off the edge of the block and reselect *Arrange•Ungroup*.

3. To finish, select *View•Screen Show•Edit Effects*. In the Edit Screen Show dialog box (see **FIGURE 1**), choose a text transition effect from the 'Choose an effect' list. Select whichever other options you want, then click *Preview Page* to test the effect. When you're satisfied with the way your chart labels move around the screen, click *OK*.

You can use the same technique with other chart types—it works particularly well with organization charts—but don't use it too much in any one show: Like most special effects, a little goes a long way. You should also note that ungrouping a chart cuts the link to its underlying data (such as a spreadsheet). Try keeping one original version of the presentation with its data links intact, and then use a copy of it when you want to apply special effects.

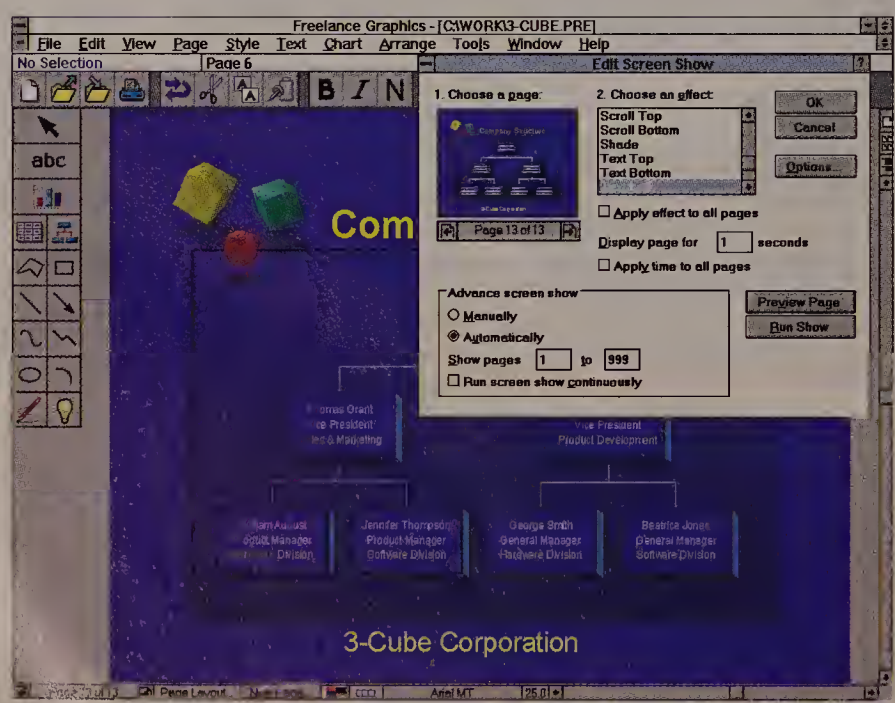

FIGURE 1: MOVE TEXT LABELS ONTO CHARTS one at a time with Freelance Graphics' text transition effects.

Freelance Printing Tricks

Q I'm used to selecting and printing nonconsecutive pages in Aldus PageMaker 5.0, and I'd like to do the same thing in Freelance Graphics for Windows. I also want to print these selected pages in two formats: full-page and handout. So far, I haven't found a way to do this in Freelance. Do you know of any shortcuts?

Michael Malinowski,
Trenton, New Jersey

A It's possible to get Freelance to print selected, nonconsecutive pages of your presentation, but it's barely mentioned in the documentation. You have to switch to Freelance's Page Sorter view and then select the pages you want to print. Here's how:

1. After opening Freelance and loading your presentation, select *View•Page Sorter* to display thumbnail versions of the whole presentation. Hold down **<Shift>** and click each page you want to print (Freelance indicates a selected page by placing a frame around it).

2. After you select your pages, choose *File•Print*. In the Print section of the Print File dialog box, check *Selected pages only*—an option that appears only when you use the Page Sorter view. Be sure *Full page* is selected in the Format section, along with any other printing options you want, and then click *Print*. Freelance will print the pages that you selected.

Unfortunately, this technique doesn't let you print handouts automatically (even though the Print File dialog box offers a Handouts option). You can, however, print handouts by staying in the Page Sorter view and dragging thumbnails of the selected pages to the front of your presentation. Then select *File•Print*, enter the range for the selected pages, check the boxes for handouts and number-per-page, and click *Print*.

One final tip: If you plan to rearrange your Freelance presentation to print handouts, be sure to work with a copy of the presentation file rather than the original. That way, you don't have to rearrange the thumbnails back in their original order after you print your handout pages.

Mastering PageMaker's Ruler Guides

Q As a new PageMaker 5.0 user, I'd welcome any tips you have on using ruler guides. For example, is it possible to copy the guides from one document to another? Also, is there a way to get rid of several guides all at once, or must you drag the guidelines off the page one at a time?

Barbara McBride, Denver

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I must confess that PageMaker's ruler guides rank right up there with fettuccine Alfredo and sweet-potato–pecan pie on my list of secret pleasures. Before answering your specific questions, I'll cover some ruler guide basics for those who've never used these handy little tools.

PageMaker's ruler guides, along with its column and margin guides, help you position text and graphics accurately and uniformly throughout a document. And because the ruler guides have snap-to and lock features, they make it easy for you to align headings, captions, sidebars, and graphics consistently.

To insert ruler guides in a document, first make sure the vertical and horizontal rulers are turned on; if they aren't, select *Layout•Guides and rulers•Rulers*. Next, move the mouse pointer to the horizontal ruler (if you want a horizontal guide) or the vertical ruler (for a vertical guide) and hold down the left mouse button. The cursor should change to a double arrow.

Continue to hold down the mouse button as you drag the cursor down to your document. When the ruler guide is where you want it, let go of the mouse button.

You can use this same technique to move guides around the page or remove them altogether. To prevent your guides from moving, select *Layout•Guides and rulers•Lock guides;* to be sure page elements line up exactly with your guides, select *Layout•Guides and rulers•Snap to guides.*

PageMaker lets you place up to 40 ruler guides on each page. If you want to make sure all the pages in a single document look the same, create a master page for the whole document. Then place the guides you want on this master page. When you're finished, select *Layout•Copy master guides* to apply the guides to actual pages.

Now to address your specific questions. First, PageMaker won't let you copy ruler guides between documents, but here's a work-around: As you did with the master page, create a blank document with guides where you want them, then save this layout grid as a PageMaker template (PT5) file. Now, whenever you want to use that particular grid, just open the template file, then save it as a PageMaker document (PM5) file and go to work.

As for your second question, the way you get rid of ruler guides depends on whether you want to delete them temporarily or permanently. If you want to hide the guides temporarily (so you can see just the printing elements in your document), select *Layout•Guides and rulers•Guides* to toggle off the nonprinting guides. You can also make the nonprinting guides appear *behind* (rather than in front of) the printing elements of the page by selecting *File•Preferences*, then clicking *Back* in the Guides section. To remove ruler guides permanently, simply press **<Shift>** while selecting *Layout•Guides and rulers•Guides*. You'll zap all of them at once.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentations consultant in Berkeley, California. Publishing & Presentations *welcomes your questions and makeover candidates (see page 12 for contact information).* ■

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COMMUNICATIONS Q & A

Keeping Kids Safe on the Info Highway

Q My kids like to dial computer bulletin boards and online services such as America Online. They know more than I do about this stuff—they're the computer experts in our house. Is it safe to let them call these services? Or would it be wise to supervise?
Peter Selby, St. Clara, West Virginia

A You should definitely supervise your children's online activities. Too many parents leave their kids alone with the computer for hours at a time, naively assuming there's no way they can get into trouble. But according to Detective Frank Clark of the Fresno, California, police department, who specializes in online crimes, that's far from the case.

Definitely supervise your children's online activities. Too many parents naively assume there's no way they can get into trouble.

"Criminals, often posing online as children, recruit kids for use in criminal activity, including hacking and credit card fraud," Clark says. Even worse, he says, children have been molested by adults they met online.

How can you keep your kids (and yourself) safe? Clark offers some advice:

- Keep the computer in a visible area of your home—for example, the family room—where you can monitor the child's computer use. Don't tuck the computer away in the corner of a bedroom. Keep an eye on your children when they're online.
- Don't let young children (say, under 12) dial online services by themselves. I know one father who logs on to BBS's with his son. Dad selects the boards carefully and asks friends to leave messages for his son so the boy has some *safe* E-mail to read.
- Tell your kids to be wary of strangers online. Impress upon them the foolhardiness of actually meeting someone they exchange online messages with, even in a public place. Remind them it's an electronic frontier: There are good folks and predators, and law enforcement is almost nonexistent. Teach your kids to be street-smart.
- Keep tabs on what your kids download, particularly if they're teenagers. Online pornography is all too accessible.
- Con artists have discovered the advantages of online anonymity, so make sure you and your kids are on guard for swindles. Never let them send anyone money or give out credit card numbers.
- Make sure your kids know they should *never* give out personal information about themselves or your family. Don't let them give anyone your family's online passwords or your address or phone number.
- Friendly debate is one thing, but if the other party starts name-calling or threatening anyone, your kids should cut off the conversation. Online fights can get out of hand and turn ugly.
- If you or your kids are ever victims of an online crime, don't hesitate to report it to the police. While few officers have online savvy, that doesn't mean they won't try to help you in any way they can.

Updating Spreadsheets via Modem at Night

Q My business has two offices on opposite sides of town. I'd like to set up a PC in one office to automatically send updated spreadsheets to a PC in the other office every night. How can I do this?
Michael Menta,
Sharon Hill, Pennsylvania

A While you can accomplish what you want with most major communications packages, including Procomm Plus and Crosstalk, they'd require a lot of futzing with script files and other techydoodle. You'd be far better off using the remote communications software Close-Up from Norton-Lambert.

You can create a *task file*—a sequence of commands such as WAIT UNTIL 11:30, DIAL, TRANSFER—to instruct the program to call the other PC at the desired time and upload the file. Close-Up also provides password protection for both PCs, and it's easier to use than the unattended file transfer facilities found in general-purpose communications programs. In addition, you can use Close-Up to run either PC remotely—even if it's running applications in Windows.

- **Close-Up 6.0** for two PCs $199; Norton-Lambert; 805/964-6767
  Reader service no. 604

Faxing Handwritten Signatures

Q Is there any way I can put my signature on a document created in a word processor that I'm sending via a fax-modem?
Roger Katrine, Leptondale, New York

A The normal route is to scan your signature with a hand-held scanner and paste it as a graphic image into the word processing file you plan to fax. If you don't have a scanner, you can use one at a local copy shop, or let them scan your signature for you. Typical cost is $8 to $15 per scan.

An alternative is to contact Isaac's Imaging of Sacramento, California, which will convert your signature into a TIFF file and send it to you on disk. The company also makes WordPerfect and Word templates with your signature already in place for either letters or faxes. Each package is only $9.95.

- **Sign Your Fax** $9.95; Isaac's Imaging; 916/427-4466
  Reader service no. 605

By Judy Heim

Judy Heim is a contributing editor for PC World *and author of the guide to communications in the forthcoming* PC Bible *from Peachpit Press.* Communications *welcomes your questions (see page 12 for contact information).*

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HARDWARE Q & A

Directory Double-Take, Take Two

Q In the item "Directory Double Take" in your June column, reader Jonathan Bishop said that when he ran DIR on a floppy and then swapped that first floppy for a second, he still got the directory listing for the first floppy when he ran DIR again. You suggested he change to drive C:, change back to the floppy drive, and then run DIR a second time.

There is a much more elegant approach. The difficulty lies with the floppy drive's *drive change line*, which is supposed to report that a new floppy has been inserted but, in this case, isn't working. To work around this problem, add a line to CONFIG.SYS: For a 1.44MB, 3½-inch drive A:, the line should read **DRIVPARM=/D:0 /F:7**.

On some floppy drives, you can get the drive change line to work properly by moving a jumper, but the specifics depend on the drive and the computer.
Eric Carlson, Washington, D.C.

A Thanks for your response. I got piles of mail from readers dissatisfied with my quick-and-dirty solution. So to all of you who wrote in, I dedicate the following listing of specs, which will work with any floppy or tape drive.

You need to add the line **DRIVPARM=/D:***drive number* **/F:***drive factor* to your CONFIG.SYS. Figuring out your drive number is easy. If your drive letter is A:, your drive number is 0. For drive B:, your drive number is 1. For drive C:, it's 2, and so on.

To calculate your drive factor, refer to the table below.

If your drive is:	Your drive factor is:
160/180K or 320/360K	0
1.2MB	1
720K	2
Tape drive	6
1.44MB	7
2.88MB	9

Note that DOS's Help mentions a DRIVPARM /C switch that allows the floppy drive to detect whether the drive door is closed. Do *not* use this option, or the fix won't work.

The CD-ROM Jitters

Q I'd like to add a CD-ROM drive to my system, but everyone I know who's tried has a horror story to tell. Should I hire someone to do this?
Arthur Needham,
Rock Springs, Colorado

A Many computer dealers (including superstores) now offer affordable upgrade services, which you might consider if you're quoted a price under $50. But this is the coward's way out.

Installing a CD-ROM drive and sound card is much easier than it was even a year ago. The reason? Installation software bundled with the hardware walks you through the process.

Nonetheless, the type of CD-ROM connector you choose may have a big effect on the ease of installation. You have five options for connecting the drive to your system: a sound card with a CD-ROM interface, an interface card that comes with the drive, a SCSI adapter already installed in your system, an IDE interface, and a parallel port. Buying an external drive and hooking it to a parallel port is the easiest route, but performance is usually subpar, and you'll pay extra for an external unit. Buying an internal IDE CD-ROM drive costs less, but installation may be difficult, and performance with video sequences and other demanding multimedia apps may suffer.

Assuming you're going to add a sound card, too—and you haven't already installed a SCSI interface card in your PC—your best choice is to buy a sound card with a CD-ROM interface so you don't waste a slot with a separate CD-ROM interface card. Drive and sound card are often bundled together in a multimedia upgrade kit that includes several cool CD-ROM titles. Whether you buy board and drive separately or in a kit, get nothing less than a 16-bit sound card with a 44-KHz stereo sampling rate and SoundBlaster compatibility; and a CD-ROM drive with double-speed operation, MPC 2 compatibility, and a 350ms average access time (a lower number is better).

If you don't buy a kit but you still want to hook the CD-ROM drive to a sound card's interface, you need to match the drive and card carefully. Sound cards usually limit your selection of drives to those the sound card manufacturer specifically lists as compatible. (You can find such a list in the card's documentation, but you should also contact the company for the latest info.) Two notable and somewhat pricey exceptions are Creative Labs' SoundBlaster 16 SCSI-2 and Adaptec's SCSI AudioMachine. Both of these excellent sound boards should be compatible with any SCSI-2 (the latest SCSI spec) CD-ROM drive, giving you the widest possible selection. You can also use these cards to connect other SCSI devices, although only the Adaptec lets you hook up a bootable hard disk.

If you go the SCSI route, here's a quick tutorial on SCSI installation: You can link as many as seven devices to one SCSI interface using a single ribbon cable, and each device on the SCSI chain (the interface and any other devices) must be given a unique SCSI ID number from 0 to 7. You assign an ID number by moving a switch or jumper on the device itself. If the CD-ROM drive is your only SCSI device, you needn't worry—most interfaces are a 7 by default, while CD-ROM drives have lower ID numbers. If there are other SCSI devices, be sure you don't give duplicate assignments.

Devices at either end of the SCSI chain must have *terminating resistors*—tiny comblike components that plug into a socket near the SCSI connector. Most SCSI devices come with these resistors in place. If you're installing just the interface and the CD-ROM drive,

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leave the resistors where they are. If you're installing an internal CD-ROM drive and there are other SCSI devices on the chain—say, a hard disk or two—make sure only the last device on the cable and the interface card have terminating resistors.

SCSI or no, most installation hassles derive from conflicts between the card you install as the interface and others in your system. Fortunately, most cards now come with software that checks which IRQs, I/O addresses, DMA channels, and ROM BIOS addresses are free, so you can set the board accordingly and avoid problems.

If this software isn't part of the package, run the MSD utility that comes with DOS; it will at least give you information on IRQs, the most likely source of trouble. Change to your DOS directory, enter **MSD**, and click *IRQ Status*. If you see 'No' or a blank in the Status Detected column, you can assign that IRQ to the card that you're installing.

Once you've configured the board and inserted it in a slot, you're ready to hook it to the CD-ROM drive. Assuming you've bought an internal model, you connect board and drive with a ribbon cable, then hook up the audio patch wire between the drive and sound card, if any. Plug a power connector into the drive, and if you've fully mounted the drive in its bay, you're done with the physical installation.

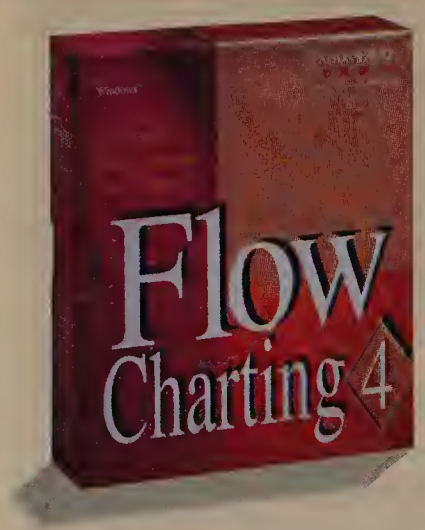
Finally, run an installation utility (which almost always comes with the interface card or sound board) that lets the drive talk to DOS. Usually, this program automatically adds a line to your CONFIG.SYS that loads a device driver for the CD-ROM drive, and then adds a line to AUTOEXEC.BAT that loads a program called MSCDEX.EXE, which comes with DOS, or a proprietary substitute. If you bought a cheap card, you may have to follow instructions and edit the files manually. Either way, the process should go smoothly if you bought the card and drive bundled together.

If you bought the card and drive separately, and the card's documentation does not list the drive you want to install as a supported device, you may never get the card and drive to work together—unless you've opted for a card with a SCSI-2 interface. If you have a SCSI card without a driver for a specific SCSI CD-ROM drive, I suggest you buy a program called CorelSCSI. Just slip the CorelSCSI disk in your floppy drive, type **INSTALL**, and follow the instructions. When you reboot your machine, the CD-ROM drive should be available as the last drive in your system.

- **CorelSCSI** $129, Corel Corp.; 800/836-3729
  Reader service no. 840
- **SoundBlaster 16 SCSI-2** $249.95, Creative Labs; 800/998-5227
  Reader service no. 841
- **SCSI AudioMachine** $399, Adaptec; 800/959-7274
  Reader service no. 842

By Eric Knorr

Eric Knorr is a contributing editor for PC World. Hardware Q&A *welcomes your questions (see page 12 for contact information).*



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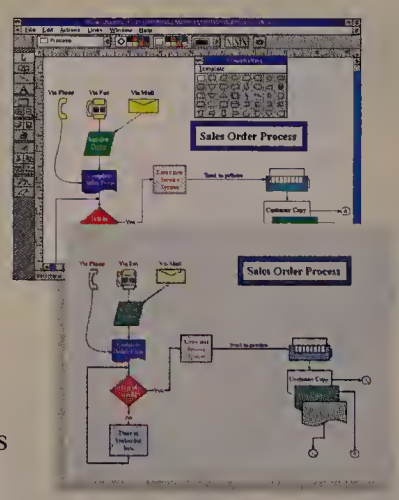

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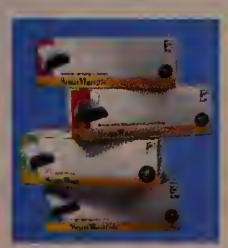

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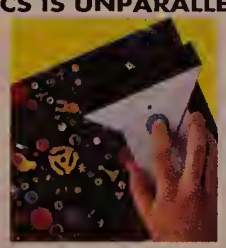

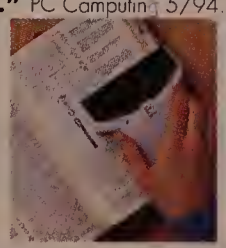

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STAR-DOT-STAR TIPS

Share and Share Alike

If you've tried to run Word 6.0 for Windows under Windows 3.1, you've probably discovered that it requires DOS's SHARE.EXE utility, which adds file-sharing features to DOS. But although SHARE.EXE lets Word work properly, it can clash with Windows' DOS boxes, keeping you from accessing files that aren't really in use by another program.

Windows for Workgroups offers a solution—a 32-bit file-sharing driver called VSHARE.386—that prevents DOS session file-sharing errors. However, you can't just use Windows for Workgroups' VSHARE.386 with Windows 3.1. Instead, you must use a newer version of VSHARE.386 that adds support for Windows 3.1. You can download the driver (which is contained in a self-extracting archive file called WW1000.EXE) from the Microsoft Download Service at 206/936-6735. To install VSHARE.386, place the file in the \WINDOWS\SYSTEM directory, add the line **DEVICE=VSHARE.386** to the [386Enh] section of your SYSTEM.INI file, and restart Windows.

Woody Sanford, Urbana, Illinois

Editor's note: Windows' OLE 2.0 requires either SHARE or VSHARE to function properly, so some kind of sharing utility is important not only for Word 6.0 for Windows, but also for other products that use OLE 2.0, such as Microsoft Excel 5.0. I recommend VSHARE rather than SHARE—not only does it work better, but it's a Windows protected-mode driver that executes in extended memory and doesn't reduce the amount of conventional memory available in your DOS boxes.

By the way, if you've already gone from Word 6.0 for Windows to 6.0a (a bug fix released earlier this year), you already have the Windows 3.1–compatible version of VSHARE.386—the upgrade patch installs it automatically. The driver is bound to be included with newer versions of other Microsoft products as well; to make sure you have it, scan the [386Enh] section of SYSTEM.INI to see if it has already been installed, and look for the file in your \WINDOWS\SYSTEM directory.

Before OLE 2.0, you could use the shareware utility NOSHAR.COM—a "dummy" program that fooled apps (such as databases) requiring SHARE into thinking that the program was installed. NOSHAR.COM doesn't actually implement file sharing (nonnetworked users shouldn't need this anyway). While this sleight-of-hand used to work, it's inadvisable these days because OLE 2.0 relies on file and record locking in order to function. If you've been using the NOSHAR.COM utility, it would be a good idea to remove it and install the VSHARE.386 utility instead.

WIN.INI line	What it defines
JumpColor	Color of jump text
PopupColor	Color of pop-up text
MacroColor	Color of macro text
IFJumpColor	Color of interfile jump text
IFPopupColor	Color of interfile pop-up text

FIGURE 1: YOU CAN CONTROL TEXT COLOR In Windows Help using these WIN.INI [Windows Help] section commands.

WIN.INI line	What it defines
M_WindowPosition	Size and position of the Main window
H_WindowPosition	Size and position of the History window
A_WindowPosition	Size and position of the Annotate window
C_WindowPosition	Size and position of the Copy window

FIGURE 2: YOU CAN CONTROL WINDOW POSITIONS AND SIZES using these keywords In WIN.INI's [Windows Help] section.

Leave Grandpaw Out of This

Here's an alternative to Tom Hard's tip for returning to parent menus from child menus ["I'm My Own Grandpaw," *Star-Dot-Star*, May]. My teenage sister recently started using computers—mainly so she could play computer games—so I created a CONFIG.SYS submenu for her that loads her programs automatically. One day I heard her complain when she pressed the wrong key and entered an incorrect submenu. I mumbled my sympathy from behind the magazine I was reading, expecting her to reboot as I always do when I end up in the wrong menu. I then watched in awe as she jabbed the <Backspace> key, returned to the main menu, made the correct choice, and started her game.

This event came just after I had spent a week trying to ask Microsoft how such a feat could be accomplished. I find it rather amusing that a teenage computer novice, who just wanted to play games, outdid Microsoft's technical support department.

Facemaster, PC World Online

Editor's note: 'Tis true: As a few (but only a few) other readers also noted, the <Backspace> key will take you to the prior menu in Microsoft's multiple-configuration menu system. (Note that pressing <Backspace> won't undo any CONFIG.SYS commands that a menu selection has already run.) However, because this sequence is unlikely to be discovered by the average user (especially now that MS-DOS comes with little or no printed documentation), it's still a good idea to have a menu item that takes you to the previous menu. By the way, be sure to give your sister an extra hour of Doom in return for making your life that much easier!

Helping Help

The Microsoft Windows Help program is the de facto standard for online help in Windows and leading Windows programs. Unfortunately, *jump text*—which you select to run a macro or call up a

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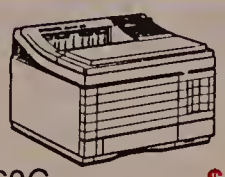

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```
[Windows Help]
H_WindowPosition=437,322,213,159,0
C_WindowPosition=288,67,470,225,0
M_WindowPosition=-4,-4,808,608,1
A_WindowPosition=72,88,307,237,0
JumpColor=0 0 255
PopupColor=255 0 0
MacroColor=0 255 0
IFJumpColor=0 0 192
IFPopupColor=192 0 192
```

FIGURE 3: MAKE WINDOWS HELP CLEARER by specifying window placement and jump text colors in WIN.INI's [Windows Help] section. Try these sample 800 by 600 display settings.

pop-up window or panel—is an awful, illegible pale green. Luckily, certain commands let you change the colors of many visual elements within Windows Help, as well as define the positions of the dialog boxes that Windows Help presents.

To change the colors and window positions, edit the [Windows Help] section of your WIN.INI file. Each color is defined by a line that contains RGB values—three numbers that define the intensities of the red, green, and blue phosphors. To make jump text a deep red, for example, just add the [Windows Help] command (or change the existing command to) **JumpColor=255 0 0.** [See **FIGURE 1** for a list of WIN.INI commands that control the colors of different kinds of text within Windows Help.]

You can also set the positions of Windows Help's main window and dialog boxes via lines in WIN.INI. For instance, the statement M_WindowPosition=-4,-4,808,608,1 sets the help system's main window to fill the entire screen on a system with an 800-by-600-pixel display. The first two numbers represent the *x* and *y* coordinates of the upper-left corner of the window; the third and fourth represent the width and height of the window, respectively; the last number determines whether the windows are maximized (1) or not (0). Windows Help uses the above settings, which are beyond the actual limits of the screen, when it maximizes a window. [See **FIGURE 2** for a list of WIN.INI [Windows Help] section commands for controlling the sizes and positions of the Help window and the dialog boxes. **FIGURE 3** contains sample Windows Help settings.] Note that some help files define their own sizes and positions for the windows and may override or actually change the settings contained in WIN.INI.

Divya Mahajan, New Delhi, India

Editor's note: This is a welcome tip, since Help certainly isn't much help if you can't read it! For years, when I've used Windows on a portable I've had trouble seeing the gray-on-gray jump text; this tip solves that problem. Also, for the curious it gives some insight into the construction of an app's help files, since it's possible to distinguish words that jump between files from those that jump to a location in the same file.

Managing Muchos Machines

Our department maintains a 250-node network of PCs, and we needed a way to track the configuration and equipment on each node without going to the actual hardware. We could have bought an expensive tracking utility, but we found we could do just as well with the System Information (SysInfo) program in Norton Utilities.

When our users log on to the LAN, the drive mapping, printer setup, and other configuration tasks are handled by a system log-in script, which in turn runs a batch file called LOADMENU. We added several lines [see **FIGURE 4**] to LOADMENU. On our

```
ECHO OFF
IF EXIST H:\SI\%EMAILNAME%.TXT GOTO STEP2
CLS
ECHO Please stand by....
ECHO Generating system configuration report
H:
CD \SI
SYSINFO /REP:%EMAILNAME%.TXT /SPEC:DEFAULT
E:
:STEP2
```

FIGURE 4: COLLECT LAN NODE DATA AUTOMATICALLY using the Norton Utilities' SysInfo utility and this batch file fragment.

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Issue America Online (AOL) commands by selecting buttons, <Alt>- and <Ctrl>-*key* combinations, and drop-down menus.

Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. Entries you must provide are shown here in *italic*. A bullet (•) links menu and command names in a series.

SENDING AND RECEIVING MAIL

Open new mail	or **<Ctrl>-R** or **M**ail • Read New Mail or (in Welcome window); select message; Read
Reply to open mail	, type message, , OK
Look up AOL member's address	Mem**b**ers • Search Member Directory, double-click Search the Member Directory, type name or other search criterion, Search
Open address book	**M**ail • Address Book; or **<Ctrl>-M** or **M**ail • Compose Mail,
Create address book group	Open address book, Create, type group name, type address in Screen Names box (see formats below), OK, OK
Add name to address book group	Open address book, select group, Modify, **<Enter>**, type name, OK
Prepare and send mail (and optionally attach file)	or **<Ctrl>-M** or **M**ail • Compose Mail, address mail, type subject, type message (optionally , select file name, OK), , OK
Address mail	Type address in To box (see formats below); or , double-click group(s), OK
Type address in format for recipient's service	AOL: *screen name* MCI Mail: *user name*@**MCI** CompuServe: *user ID*@**CIS** (use period in place of comma in user ID) Internet: *name@company name* Fax: *name@area code-fax number*
Save open message to disk	or **<Ctrl>-S** or **F**ile • **S**ave As, type file name, select directory, OK
Print current message	, OK

NAVIGATING SERVICES AND FORUMS

Go to service or forum	or **<Ctrl>-K** or **G**o To • Keyword, type service or forum's keyword (see other side of card), OK
Go to Departments menu	Departments (in Welcome window) or **<Ctrl>-D** or **G**o To • Departments
Go to news, weather, and finance	; or go to Departments menu,
Read today's top news stories	(in Welcome window) or or **<Ctrl>-8** or **G**o To • Top News
Go to stock quotes	or **<Ctrl>-9** or **G**o To • Stock Quotes
Go to directory of AOL services	or **G**o To • Directory of Services

Fold Here

NAVIGATING SERVICES AND FORUMS (cont.)

List new AOL features and services	or **<Ctrl>-3** or **G**o To • New Services
Go to lifestyles, hobbies, and recreation forums	; or go to Departments menu,
Go to entertainment services and movie reviews	; or go to Departments menu,
Go to educational services/forums	; or go to Departments menu,
Go to computer support forums	; or **<Ctrl>-1**; or go to Departments menu,
Go to travel services	; or go to Departments menu,
Go to chat rooms	; or **<Ctrl>-L**; or go to Departments menu,
Get help	; or go to Departments menu, ; or **G**o To • Members' Online Support
Log off AOL	**G**oto • Sign Off or **F**ile • **E**xit; **Y**es or **E**xit Application

Fold Here

USING PUBLIC MESSAGE FORUMS

Read new message	or , , select message,
Browse for and read message	, click subject, , select message,
Send forum message	, type subject, type message, or
Reply to open message	, type response, or
Save open message to disk	or **<Ctrl>-S** or **F**ile • **S**ave, select directory, type file name, OK
Print open message	or **<Ctrl>-P** or **F**ile • **P**rint, OK
Join forum conference	or

FINDING AND DOWNLOADING FILES

Search for PC software (AOL-wide)	, select time frame, select application categories, optionally type keyword(s), List Matching Files
Search for PC software (in forum)	, select time frame, select application categories, optionally type keyword(s), List Matching Files
Display forum's file library	
Download selected file now	, type file name, OK
Download selected file later	, OK
Display list of files to download later	or **<Ctrl>-T** or **F**ile • Download Manager
Log current session in file	**F**ile • **L**ogging, Open (in Session Log section), type file name, OK

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AMERICA ONLINE: SERVICE AND FORUM KEYWORDS

See "Navigating Services and Forums" section and "Go to service or forum" entry on other side of card.

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Atlantic Monthly	**atlantic**
Business News	**business**
Chicago Tribune	**chicago**
CNN Newsroom	**cnn**
Columnists & Features	**columns**
CSPAN Online	**cspan**
Entertainment news	**entertainment**
National Geographic	**ngs**
New Republic	**tnr**
News of the day	**news**
San Jose Mercury News	**mcnews**
Saturday Review	**sro**
Smithsonian Online	**smithsonian**
Sports News	**sports**
Time Magazine	**time**
Washington Week in Review	**wwir**
Weather	**weather**

Fold Here

BUSINESS AND FINANCE

Bulls & Bears Stock Market Simulation Game	**bulls and bears**
Business News	**business news**
E*Trade electronic discount brokerage	**bulls and bears**
Investor's Network	**invest**
Job Listing Database	**jobs**
Main business and finance menu	**business**
Morningstar Mutual Fund report cards	**morningstar**
Real Estate Online	**realestate**
San Jose Mercury News business news	**mcnews**
Stock quotes	**stocks**

COMPUTER HARDWARE

Acer Corporation	**acer**
Ares Microdevelopment	**ares**
Compaq Computer Corporation	**compaq**
Computing forums	**forums**
Dell Computer	**dell**
Diamond Computer Systems	**diamond**
Gateway 2000, Inc.	**gateway**
GCC Technologies	**gcc**
Hardware forum	**hardware**
Leading Edge	**leading edge**
Nikon Electronic Imaging	**nikon**
Personal Computer Peripherals Co.	**pcpc**
Tandy Computer	**tandy**

COMPUTER SOFTWARE

Aldus Corporation	**aldus**
Altsys	**altsys**
Applications forum	**pap**
Asymetrix Corporation	**asymetrix**
Berkeley Systems	**berksys**
Broderbund Software	**broderbund**
Caere Corporation	**caere**
Central Point Software	**cps**
Claris	**claris**
CP/M and MS-DOS SIG	**adv**
DacEasy	**daceasy**
Development forum	**programming**
DOS forum	**dos**
Fifth Generation	**fifth**
Geoworks Support Center	**geoworks**
Graphics forum	**graphics**
Iomega	**iomega**
LucasArts Entertainment Company	**lucasarts**
Maxis	**maxis**
Micrografx	**mgx**
Microsoft Resource Center	**microsoft**
Mustang Software	**mustang**
Novell Digital Research, Inc.	**digitalresearch**
ON Technology	**on**
OS/2 forum	**os2**
Pixar	**pixar**
Quark, Inc.	**quark**
Software Center	**software**
Stac Electronics	**stac**
Symantec Corporation	**symantec**
Telecommunications forum	**ptc**
Timeworks, Inc.	**timeworks**
T/Maker	**tmaker**
Windows forum	**win**
WordPerfect Support Center	**wordperfect**

ENTERTAINMENT AND TRAVEL

Cartoons	**cartoons**
Disney Adventures Magazine	**disney**
EAAsy Sabre	**sabre**
Entertainment main menu	**entertainment**
Geraldo Show	**geraldo**
Movie reviews	**movies**
Omni Magazine	**omni**
Television forums	**television**
Travel main menu	**travel**
Travel message forum	**traveler**
Wine & Dine Online	**wine**
WIRED Magazine	**wired**

SPECIAL INTERESTS

Astronomy Club	**astronomy**
Aviation forum	**aviation**
Baby Boomers	**baby boomers**
Bicycle Magazine Online	**bicycling**
Bicycle Network	**bicycle**
Bull Moose Tavern	**politics**
Compute Magazine	**compute**
Disabilities forum	**dis**
Dolby Audio/Video forum	**dolby**
Environmental forum	**environment**
Express Yourself forum	**debate**
Flying magazine	**flying**
Gadget Guru electronics forum	**electronics**
Gay & Lesbian forum	**gay**
Ham Radio Club	**hamradio**
Internet Center	**internet**
Military & Vets Club	**military**
Multimedia Exchange	**multimedia**
National Space Society	**nss**
Photography forum	**kodak**
Religion & Ethics forum	**religion**
Road & Track Online	**autos**
Rocklink	**rocklink**
Science Fiction & Fantasy forum	**science fiction**
Scuba Club	**scuba**
SeniorNet Online	**seniornet**
Star Trek Club	**star trek**
Teachers' forum	**ttalk**
Trivia Center	**trivia**
Writer's Club	**writers**

Fold Here

FAMILY SERVICES

Academic Assistance Center	**homework**
Ask the Doctor	**ask the doctor**
Better Health & Medical forum	**health**
Compton's Encyclopedia	**comptons**
Consumer Reports	**consumer**
Cooking Club	**cooking**
Gifted Online	**mensa**
KIDSNET	**kidsnet**
Kids Only Online	**kool**
Library of Congress Online	**library**
National Public Radio Outreach	**npr**
NEA public forum	**nea public**
Parents' Information Network	**parent**
Pet Care Club	**pet care**
Teen Scene	**teen**
Tomorrow's Morning (for kids)	**morning**

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LAN, H: is a shared volume all users can access, so we created the directory H:\SI to hold the configuration information. To collect the latest configurations, we use DEL *.* to delete all the files in this directory (except for SYSINFO.EXE and NLIB100-.RTL, marked as read-only). Each user's configuration is reported again the next time he or she logs on.

Larry Carnes, Columbia, South Carolina

Editor's note: This is a great way to track the configurations of all the nodes on a LAN. Besides reporting the basic equipment each system contains, SysInfo also records a *computing index*—a speed benchmark that detects anything that's bogging down the system. If you don't have a copy of Norton Utilities and don't care about testing system speed, you can instead use Microsoft Diagnostics (MSD), the diagnostic program included with DOS and Windows. You just substitute the line **MSD /P %EMAILNAME%.TXT** for the one that invokes SYSINFO in the batch file.

There are two things to watch for, however, if you use Carnes's solution. First, make sure you have a license to use Norton's SysInfo program on all the systems on your LAN; otherwise, it's a license violation to set up this sort of batch file. (If you don't want to buy such a license, just use MSD.)

Second, because the technique names report files with the user's E-mail name, make sure that users don't log on from more than one system or from someone else's system. (This is in any case a good security measure, one that's supported by most LAN software, including NetWare.) Otherwise, the data for one person's system could be associated with another's E-mail name. If it's not practical to restrict users to a single machine, use the node's name (on a NETBIOS network) or the node's IP, IPX, or ethernet address (on other types of networks) to generate a unique file name for each node. Since the technique for obtaining information about a node varies from LAN to LAN, check the documentation for your specific network to find out how to get the system's name or address.

By Brett Glass

Brett Glass is a contributing editor for PC World. Star-Dot-Star *welcomes your tips, macros, batch files, and short programs (see page 12 for contact information).*

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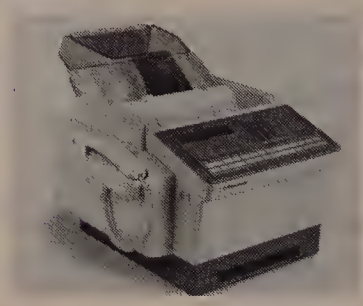

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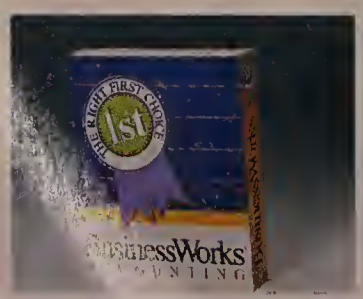

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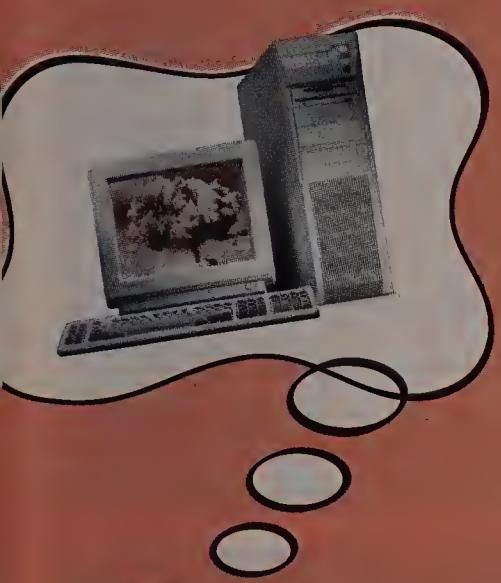

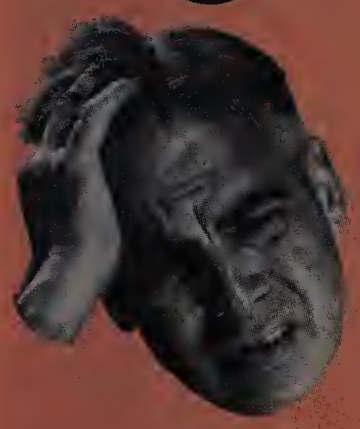

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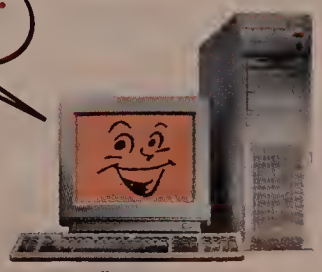

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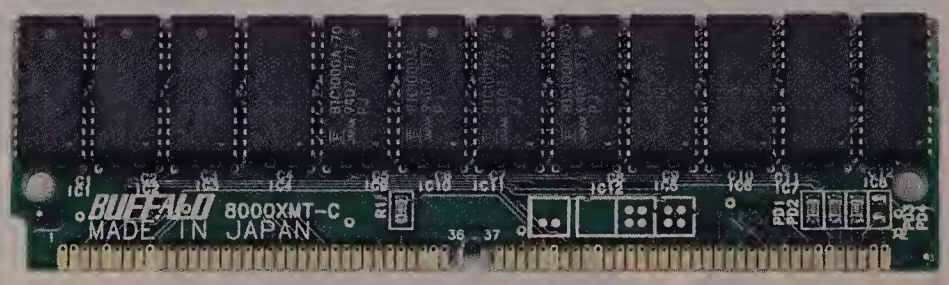

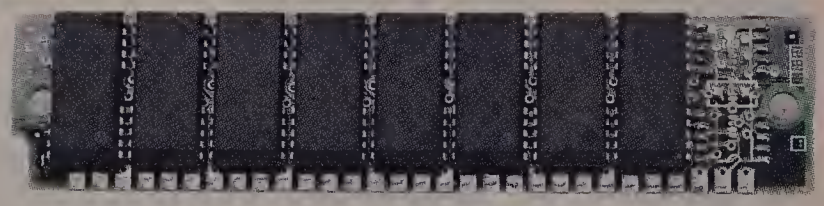

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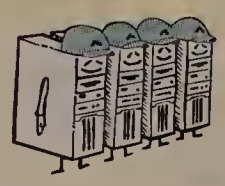

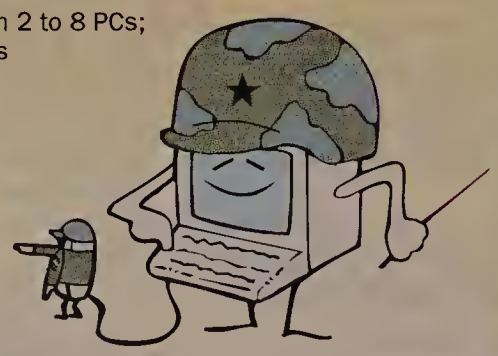

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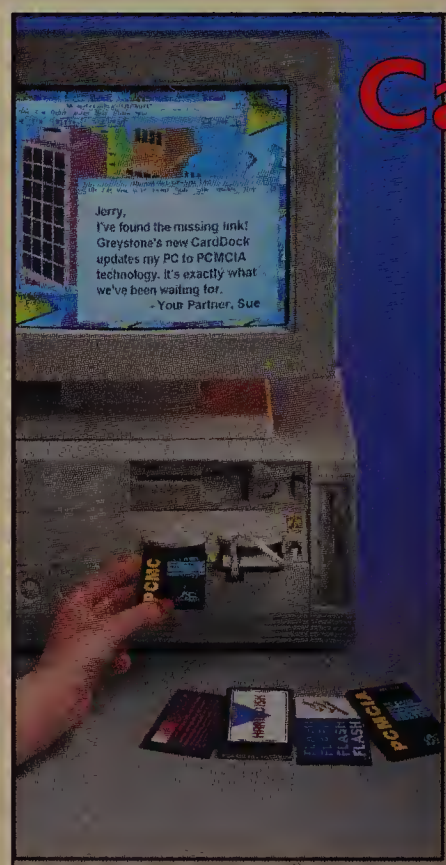

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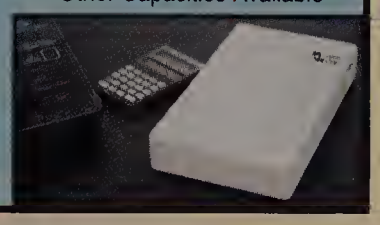

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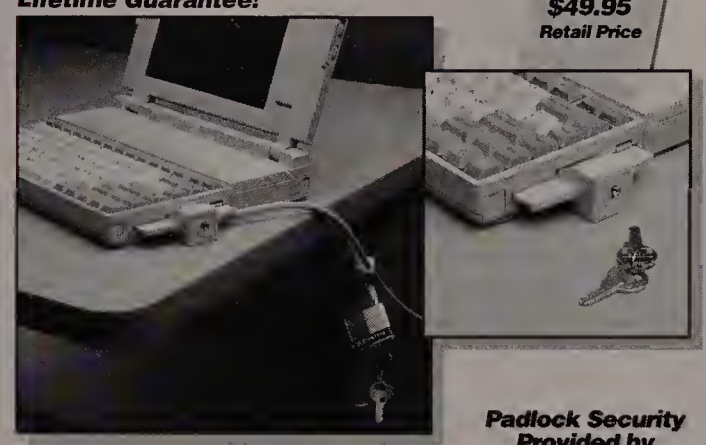

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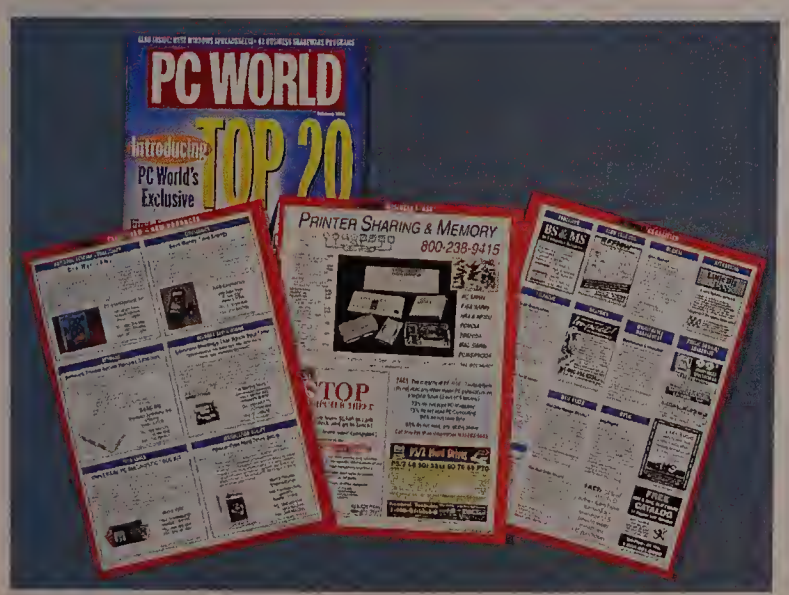

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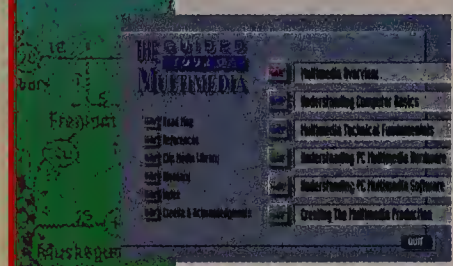

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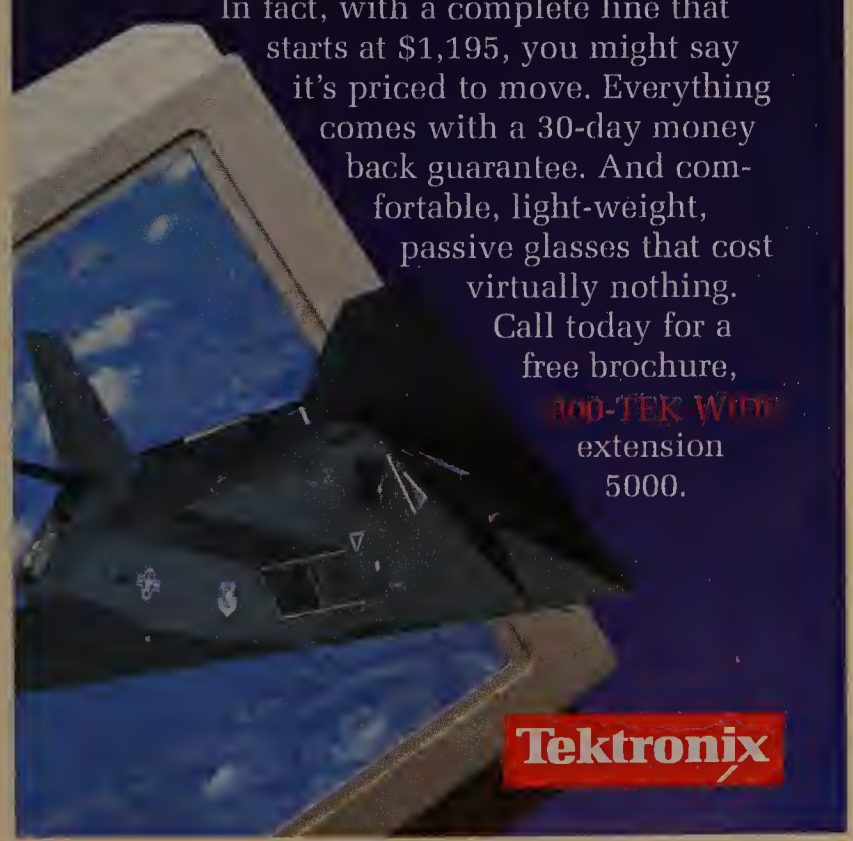

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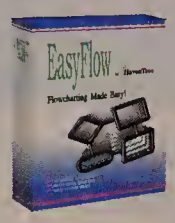

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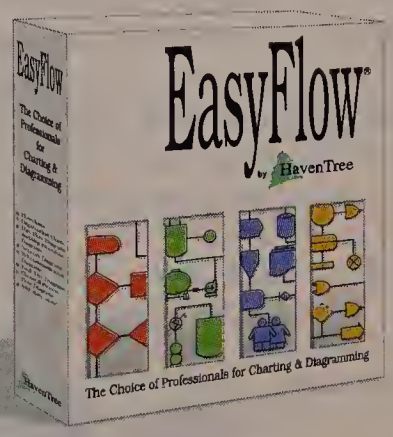

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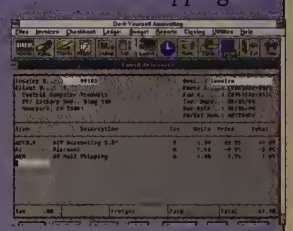

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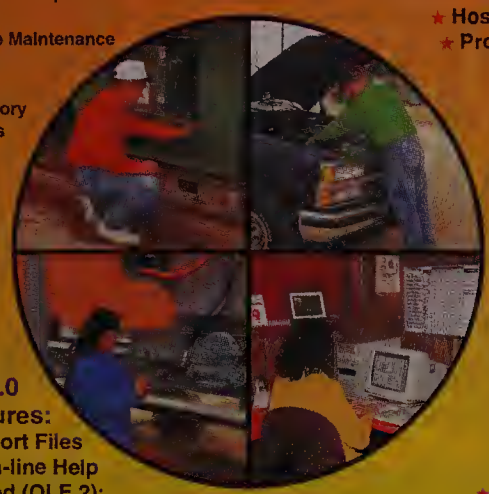

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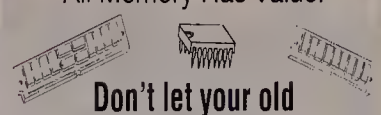

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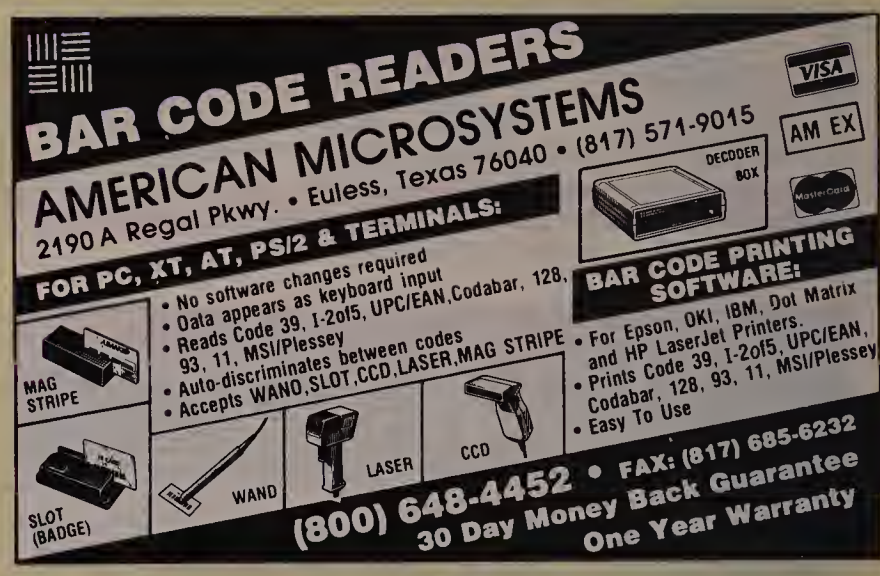

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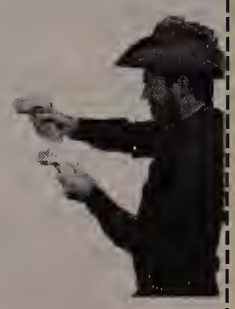

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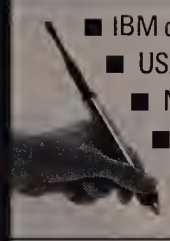

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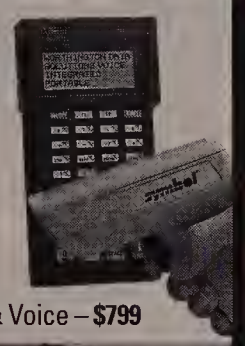

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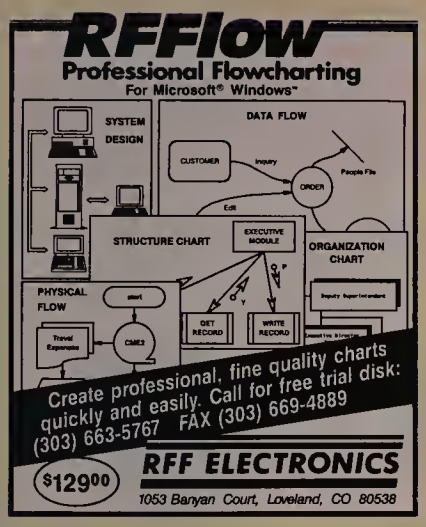

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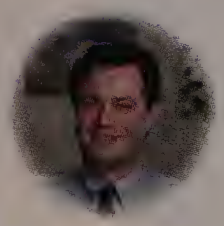

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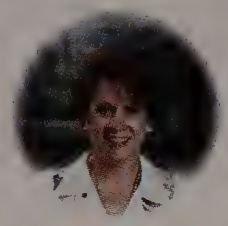

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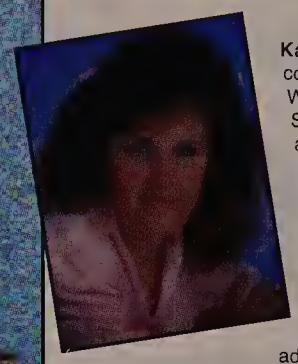

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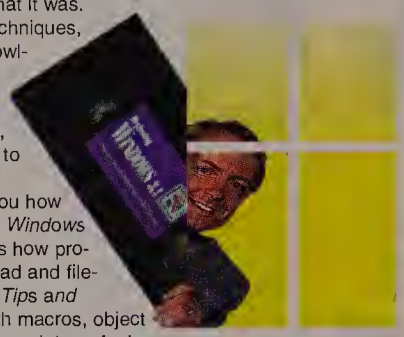

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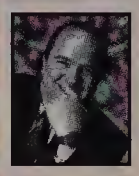

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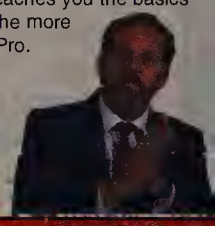

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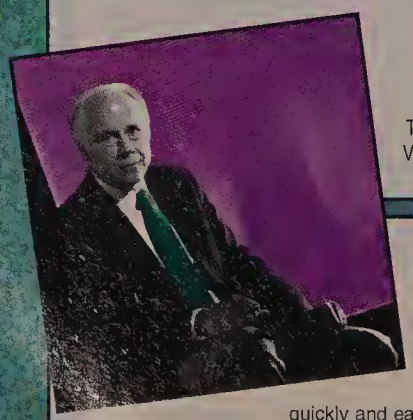

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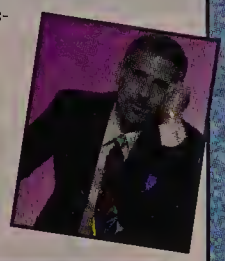

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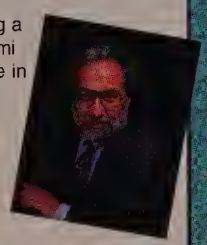

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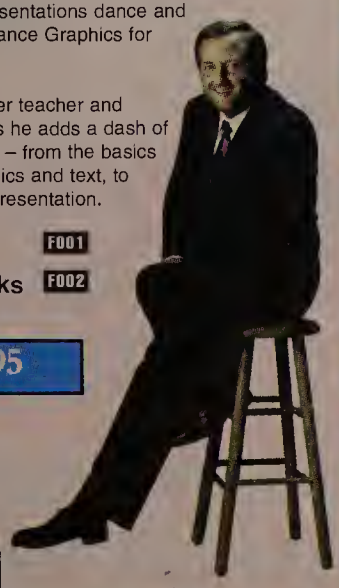

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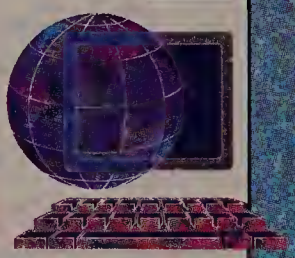

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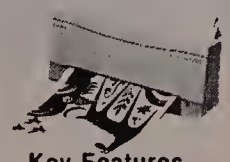

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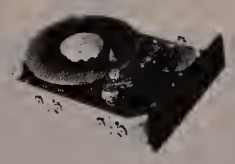

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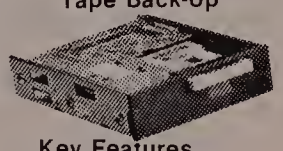

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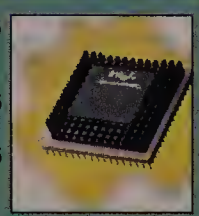

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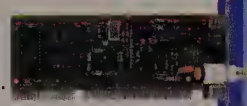

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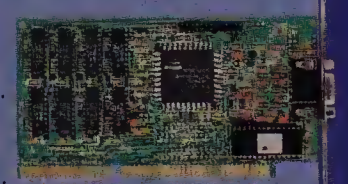

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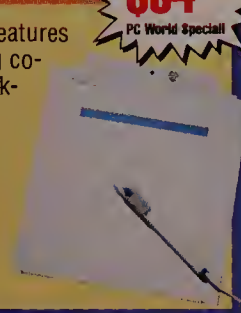

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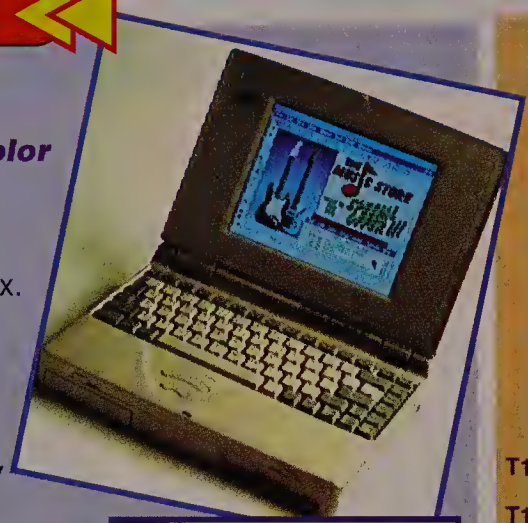

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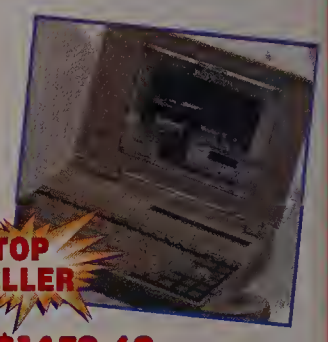

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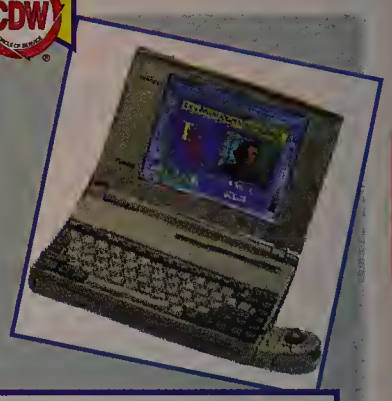

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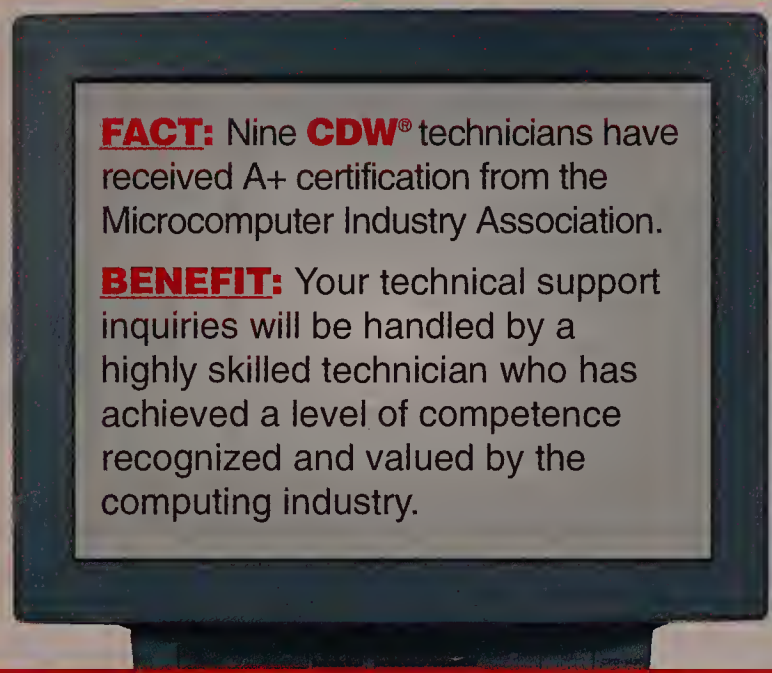

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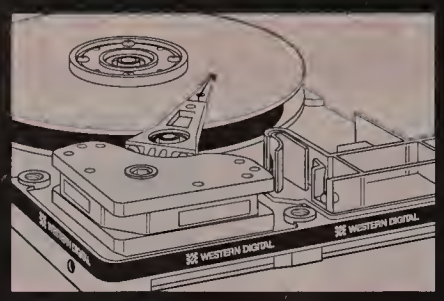

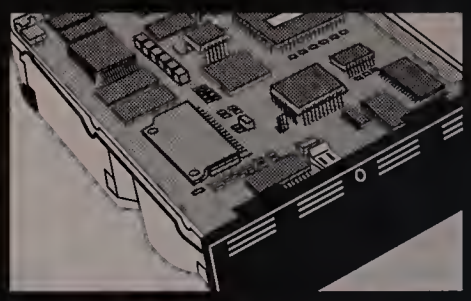

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XM3401	$425	$549	$425	$479
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PX43CH	$659	$779	$659	$699
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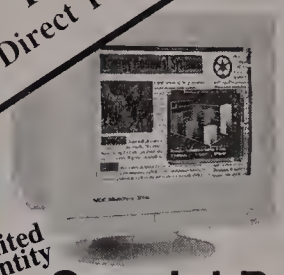
USA Flex...Your

★★★★½ PC/Computing Direct Top 60, July 1994

NEC



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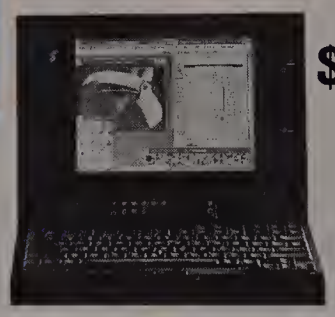

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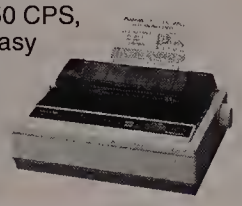

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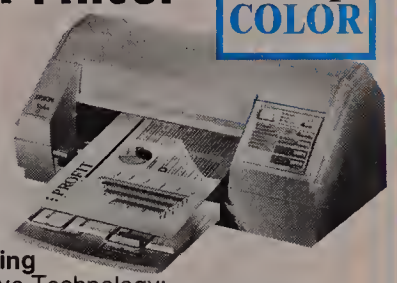

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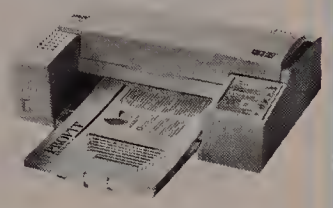

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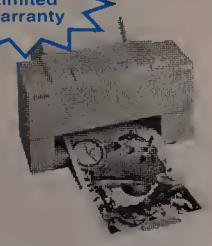

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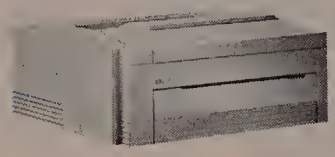

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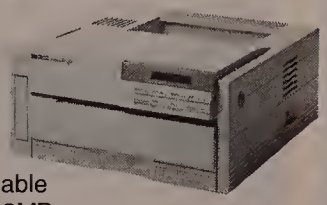

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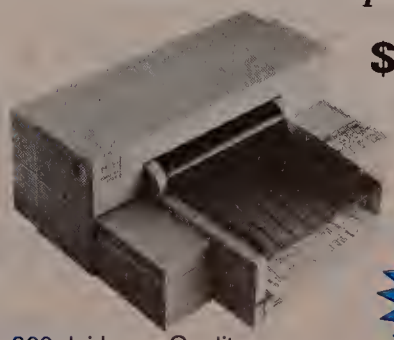

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Ambra NC 425SL	2/4/8 Meg	109.00/209.00/449.00
Ambra N Series	4/8/12/16 Meg	189.00/379.00/569.00/829.00
Ambra SN Series	4/16 Meg	189.00/829.00
Ambra Sprinta SLC ii	2/8 Meg	89.00/319.00

CYRIX DRx² 386 to 486 Upgrade

Clock Doubler

- Single chip upgrade solution
- Clock doubling technology
- Compatible with industry standard 386DX CPU socket
- Compatible with DOS, Windows, 3:X, OS/2 1.3 and 2.x
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- Easy to Install—about 15 minutes

The Cyrix upgrade runs at twice the speed of your original 386 microprocessor combined with a 1K on-chip cache you will enjoy a performance boost of 100% and more. Ideal for any DOS, Windows or OS/2 application which requires a large amount of microprocessor horsepower.

CX486 ORx²-16/32	264.00
CX486 DRx²-20/40	274.00
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CX486 ORx²-33/66	354.00
CX486 SRX2 16/32	244.00
CX486 SRX2 20/40	244.00
CX486 SRX2 25/50	269.00

SIMM MODULES (Add $5.00 for SIPP)

	40NS	50NS	60NS	70NS	80NS	100NS
1Meg x 9 (3 chip)	–	49.00	44.00	43.00	41.50	–
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4Meg x 9	–	–	162.00	158.00	149.00	–
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256 x 36 1 mg	–	–	–	–	59.00	–
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1 meg x 36 4 mg	–	–	184.00	174.00	174.00	–
2 x 36 8 mg	–	–	359.00	339.00	339.00	–
4 x 36 16 mg	–	–	689.00	669.00	669.00	–
8 x 36 32 mg	–	–	1459.00	1419.00	–	–
16 x 36 64 mg	–	–	2806.00	2745.00	–	–
1 x 32 4 mg	–	–	174.00	164.00	–	–
2 x 32 8 mg	–	–	339.00	319.00	–	–
4 x 32 16 mg	–	–	649.00	629.00	–	–

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83S87-33SX – **79.00** **PC Week™** rated #1 over all math chips
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AST MEMORY

MODEL	AMT. UPGRADED	AST PART #		PRICE
Bravo LC 4/25S, 4/33, 433S, 4/50d, 4/66d	4Meg	500987-002	72 pin	165.00
	8Meg	500987-003	72 pin	330.00
	16Meg	500987-004	72 pin	619.00
	32Meg	500987-005	72 pin	1399.00
Premium 486/25, 25E, 33, 33E				
Premium 386/33TE, 486/25TE, 33TE				
Prem. Serv., Prem II 386SX/20, 25				
Prem. II 386/25, 386/33, 486/33, 486SX/20	8Meg	500780-001	64 pin	398.00
Premium 386/33T, Prem. 3868X/16				
Prem. II 386SX/20, 25		500780-004	64 pin	189.00
Premium 386/25, 33, 386/33T, 386SX/16,		500780-003	64 pin	59.00
Prem. II 386SX20,25		500780-001	64 pin	59.00
Premia 4/33S, 4/33, 4/50D, 4/66D	8Meg	501159-002		379.00
Premia	16Meg	501159-003		789.00
Premia	32Meg	501159-004		1469.00
Premia	64Meg	501159-005		3111.00
AST Cupid 8d	0–32Meg	500818-001		179.00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #	PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME	59.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK	180.00
Z386SX	2Meg	Z-605-1 modules	119.00

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286/386SX-16, 386SX-20, 486SX-20 & 386-33 *all are 72PIN SIMM:*
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30F5360 (2Meg)	30-286, 25-286, 50 MTHR BD	104.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	84.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	189.00
6450604 (2Meg)	70-061, 061, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	89.00
6450608 (2Meg)	70-A21, A-61, 8-21, 8-61, 35SX, 35LS, 40SX, Val Pt. 325T	90.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	175.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	175.00
1057035 (512K)	P/S1-286	49.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	109.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	189.00
92G7200 (4Meg)	PSI Expert, Consultant, Willow	175.00
92G7201, 73G3131 (4Meg)	Value Point Performance, PC Server 4/66	175.00
92G7203 (8Meg)	Value Point Performance, PC Server 4/66	339.00
92G7204 (16Meg)	Value Point Performance, PC Server 4/66	629.00
92G7205 (32Meg)	Value Point Performance, PC Server 4/66	1459.00
96F9290 (4Meg)	Standard 1x3-70 Simms	172.00
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6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC	90.00
60G1622 (16Meg)	Value Point 77 486DX2, 486SX, SVR 85	699.00
6450128 (4Meg)	PS/1, Value Point Perf.	175.00
	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Mod-2123, 2133, 2155, Val Pt 77, 486CS2, 486SX, SVR85	
	Value Point 77 486DX2, 486SX, SVR 85	
6450129 (8Meg)	35SX, 40SX	339.00
6450130 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC	339.00
	Value Point 77 486DX2, 486SX, SVR 85	
6451158 (4Meg ecc)	486; 95XP; 95A (Install in pairs)	199.00
6451159 (8Meg ecc)	486; 95XP; 95A (Install in pairs)	399.00
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79F0999 (2Meg)	LX40, N33SX, PS Note	103.00
79F1000 (4Meg)	LX40, N33SX, PS Note, Tkpd 350, 350c, PS Note 425	189.00
79F1001 (8Meg)	LX40, N33SX, PS Note	369.00
07G1415 (4Meg)	Thinkpad 750, 750c, 755 360	209.00
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07G1420 (4Meg)	CL57LSX LpTp, Thinkpad 700, 700C 720, 720C	209.00
07G1421 (8Meg)	CL57LSX LpTp, Thinkpad 700, 700C 720, 720C	389.00
60G0378 (8Meg)	Thinkpad 350, 350c, PS Note 425	339.00
60G0379 (16Meg)	Thinkpad 350, 350c, PS Note 425	649.00
92F8804 (2Meg)	N45SL	109.00

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MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
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	8Meg Module	116561-001	399.00
	32Meg Module	116568-001	1399.00
OeskPro 386/33L, 486/33L	(Exp 8d)	116569-001	279.00
OeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	199.00
OeskPro 386S-16MHz	1Meg Exp Bd	113633-001	149.00
	4Meg Exp 8d	113634-001	279.00
	1Meg Module	113646-001	79.00
	4Meg Module	112534-001	199.00
OeskPro 386/20E	1Meg Exp 8d	113644-001	149.00
OeskPro 386/25E	4Meg Exp Bd	113645-001	279.00
	1Meg Module	113131-001	79.00
	8Meg Module	113132-001	199.00
OeskPro 286N, 386N, 386SX20; all "M" series, sytem LT series, all "I" series	1Meg Module	118688-001	59.00
	2Meg Module	118689-001	89.00
	4Meg Module	118690-001	169.00
	8Meg Module	128877-001	339.00
M Series Exp 8d	0-64Meg	129160-001	189.00
OeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	299.00
	1-2Meg Exp 8d	108069-001	239.00
	4-8Meg Exp 8d	108070-001	437.00
OeskPro 286	512K Kit	113012-001	49.00
OeskPro 5/60, 5/66M, 5/66M — ALL OF THESE MACHINES USE THESE MODULES	8Meg Kit	149911-001	389.00
Prosignia 5/60	16Meg Kit	149949-001	699.00
Proliant 100 5/60	32Meg Kit	149912-001	1356.00
Proliant 2000 4/30, 5/66	64Meg Kit	149913-001	2516.00
Proliant 4000 4/50, 5/66	128Meg Kit	149914-001	5799.00
Prolinea 386 3/25S, 3/252S	2Meg	141738-001	90.00
	8Meg	141742-001	316.00
Prolinea 486 4/25S, 4/33, 4/50, 4/66, COS	2Meg	141683-001	95.00
Enhanced Prolinea, Prosario series	4Meg	141684-001	175.00
	8Meg	141685-001	339.00
Prosignia PC Server, 486/33, 486 DX2/66	8Meg	141685-001	339.00
	16Meg	149320-001	629.00
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LTE/286	2Meg 8d	117081-002	99.00
LTE/286	4Meg 8d	117081-003	179.00
LTE/386S/20	4Meg Module	121125-002	209.00
LTE LITE/20, 25, 25C	4Meg Module	129769-002	209.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	409.00
LTE LITE/20, 25, 25C	16Meg Module	129769-004	809.00
LTE LITE 425C/33C/25E/25L	4Meg Module	142337-002	189.00
LTE LITE 425C/33C/25E/25L	8Meg Module	142337-003	349.00
LTE LITE 425C/33C/25E/25L	16Meg Module	142337-004	718.00
SLT/286	1Meg Module	110235-001	75.00
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SLT/386	4Meg Module	118305-001	219.00
Concerto, LTE Elite	4Meg	144790-001	189.00
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	16Meg	144790-003	719.00
Contura 320, 325	2Meg	139497-001	99.00
	4Meg	139498-001	189.00
	8Meg	139499-001	349.00
Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	189.00
	8Meg	146521-001	339.00
	16Meg	146531-001	739.00
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T2000/T2000SX	2Meg	PC18-PA8317U	79.00
T2000SX/T1000LE	4Meg	PC-PA8314U	189.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	359.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	79.00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	189.00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	359.00
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	199.00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	369.00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	699.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	4Meg	PC-PA2012U	199.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	8Meg	PC-PA2013U	389.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3.3 v)	16Meg	PC-PA2014U	769.00
T3300SL	6Meg	PC-PA2008U	268.00
T3300SL	16Meg	PC-PA2009U	699.00
T3400CT, T2400, T3600	4Meg	PC-PA2019U	194.00
T3400CT, T2400, T3600	8Meg	PC-PA2020U	369.00
T3400CT, T2400, T3600	16Meg	PC-PA2021U	763.00
T3400CT	32Meg		1549.00
T1200XE	2Meg	PC13-PA8306	99.00
T1600	2Meg	PC8-PA8302U	99.00
T3100	2Meg	PC3-PA7135E	139.00
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T3100SX	2Meg	PC15-PA8308U	109.00
T3100SX	4Meg	PC15-PA8310U	189.00
T3200	3Meg	PC6-PA7137U	185.00
T3200SX	2Meg	PC12-PA8307U	119.00
T3200SX	4Meg	PC12-PA8909	199.00
T3200SXC	2Meg	PC19-PA8318U	119.00
T3200SXC	4Meg	PC19-PA8319U	199.00
T5100	2Meg	PC7-PA8301U	95.00
T5200/T8500	2Meg	PC10-PA8304U	114.00
T5200/T8500	8Meg	PC10-PA8313U	419.00

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 730	2Meg/4Meg/8Meg		109/209/399
ACER 750	4Meg/8Meg/16Meg		199/459/869
ALR Venture	4Meg	12407980	249.00
AST Ascentia 900N	4Meg/8Meg/16Meg		229/469/899
AST Bravo & Explorer	4Meg/16Meg	501255-001, -002	189/789
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	189.00
AST Power Exec 3/25C, 425EL	4Meg		199.00
AST Power Exec 3/25C, 425EL	16Meg		819.00
AST Power Exec 425SL	4Meg	501166-001	199.00
AST Power Exec 425SL	16Meg	501166-003	819.00
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	194/769
AT&T Safari NSX/20	4Meg	PEC 37651	259.00
Bondwell 8310, Plus	1Meg	23050-09100	109.00
Bondwell 8310V, SX	1Meg		109.00
Bondwell 8310V, SX	4Meg		229.00
Canon Innova 486	2Meg/4Meg/8Meg		109/209/449
Canon Notejet 486	4Meg/ 8 Meg		199/389
Chicony, Ultra, Hyundai 386	4Meg		199.00
Epson NB3	4Meg	A808511	199.00
Everex Tempo LX, LX20, Carrier	2Meg	PCA 00053-0001	109.00
Gateway 2000 Colorbook 4/33	4Meg/16Meg		199/799
Gateway 2000 Nomad 425 OXE/SXL	4Meg/16Meg		199/1199
Gateway 2000 486 Handbook	4Meg/16Meg		199/799
Goldstar GS520 386SX/16	4Meg	S386-4M	249.00
Grid 1720, 1750, 1755	1Meg		49.00
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NCR Safari 3180	4Meg/ 8 Meg		229/449
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NEC Prospeed 286, 386SX-16	4Meg	PC21-22	199.00
NEC Prospeed 386	2Meg	PC31-21	119.00
NEC Prospeed 386	8Meg	PC31-22	399.00
NEC Prospeed 386SX-20	1Meg	PC43-21	79.00
NEC Prospeed 386SX-20	4Meg	PC43-22	199.00
NEC Ultralite Versa	4 Meg/8Meg/16Meg/20Meg	OP4104	183/359/799/988
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	109/199
Packard Bell Statesman	2Meg/8Meg		119/419
Panasonic CF170, CF270, CF370	1Meg	CF-8A165	49.00
Panasonic CF380, CF480	2Meg/4Meg/6Meg		119/199/309
Panasonic CF-V21P, CF-580	4Meg/16Meg		219/819
Sanyo 17/18 N8	2Meg	M8C-N8MEM2	109.00
Sharp 6781, 6881, 6785, 6700, 6800, 6741	2Meg/4Meg		109/199
Sharp PC-6220	1Meg	CE 6218	79.00
Tandon, PC Brand, Dataworld	2Meg/8Meg	N8386SX-20	119/429
TI Travelmate 2000	1Meg	2568034-0001	79.00
TI Travelmate 3000	2Meg	2566996-1	84.00
TI 4000, TI 4000E	4Meg/16Meg		199/999
TI 4000M	4Meg/ 6Meg		Call
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Twinhead, Altima, Computyne 486SX, DX, Tandy 4860	4Meg/16Meg		199/859
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Zenith Master Sport SL, SLE, 600, 620, 625NL	2Meg	ZA-4-4	119.00
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286E, SX	2Meg	ZA-180-64	149.00
SX Alpha	2Meg	ZA-180-86	149.00
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Zenith Z-Note 325L, LC	2Meg/8Meg	ZA3250-4/5	129/419
Zenith Z-Note 425LN, LNC, LNP	4/8/16Meg		209/469/839
Zenith Z-Star 4/33	2/8Meg		119/419

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Canon LBP 860	–	–	–	99	–	–	179	–	–	349	669	1249
Canon LBP4, 4Lite, 4plus	–	–	159	219	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	139	–	–	229	–	–	–	–	–
Epson Action Laser II	–	–	89	–	208	–	–	327	–			
Epson 8000	–	–	89	–	208	–	–	327	–			
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HP 3Si	–	–	69	–	–	–	169	–	–	349	–	–
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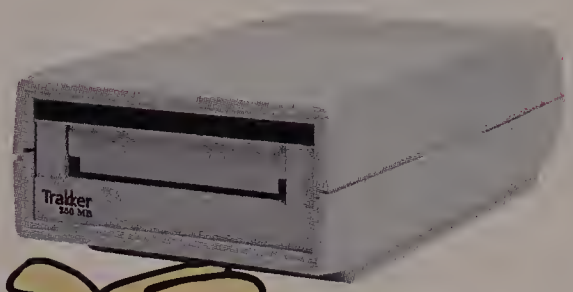

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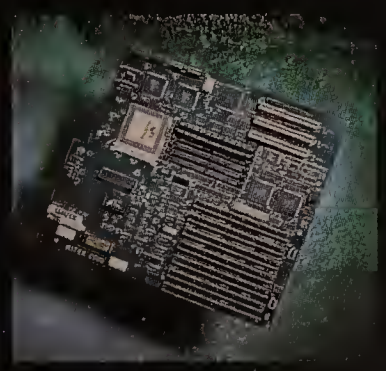

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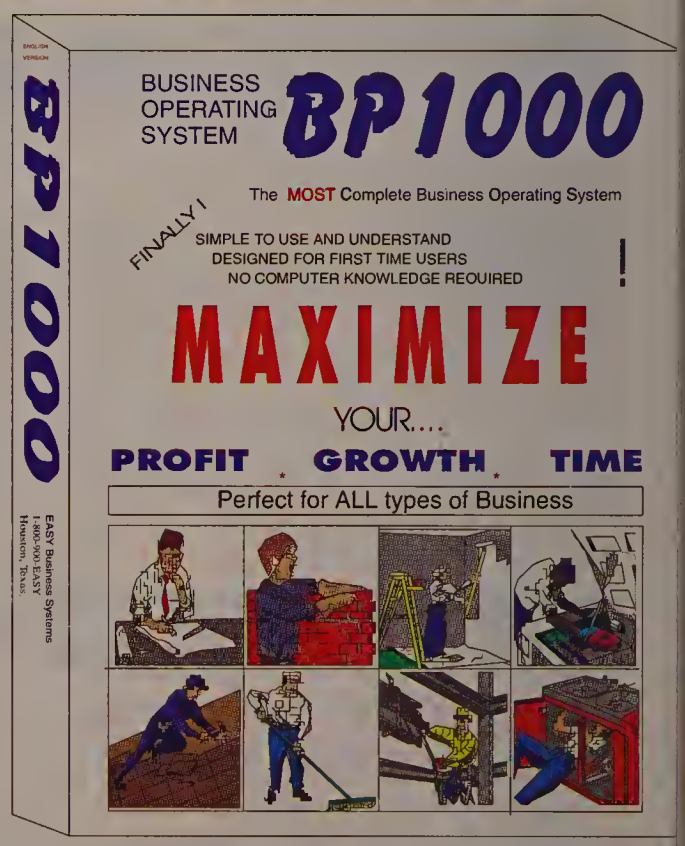

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952 Notebook computers
953 DTP/Presentation software
954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

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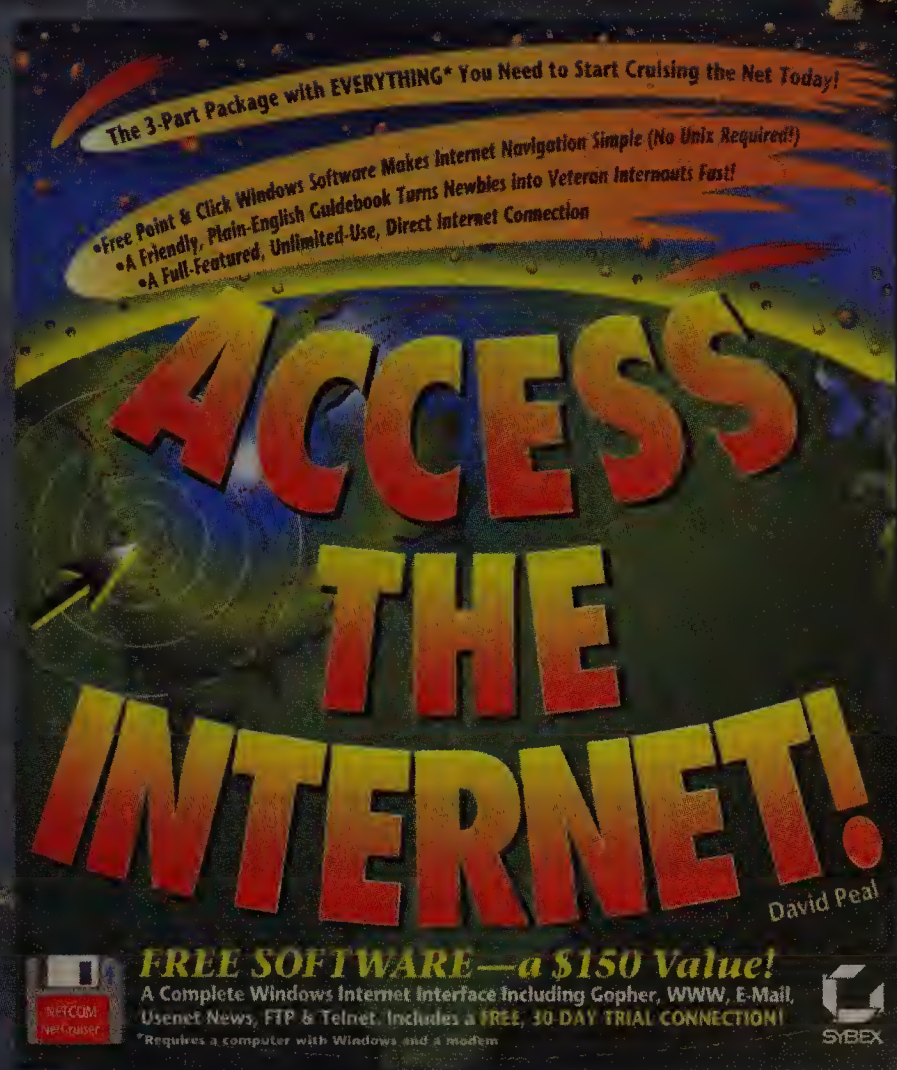

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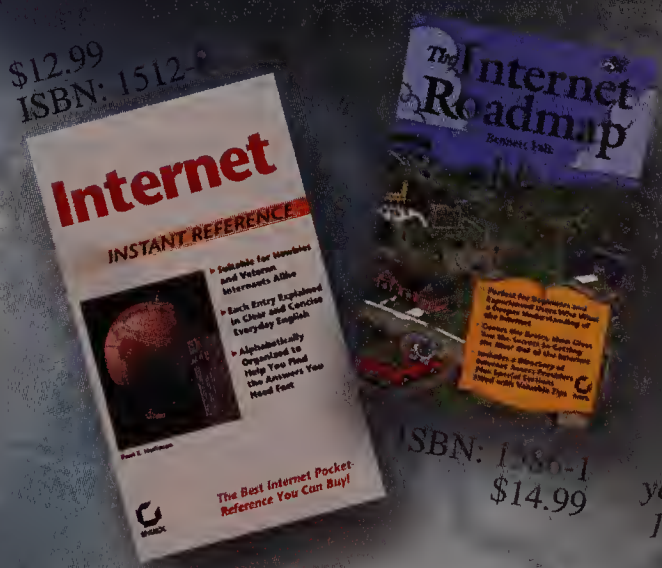

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Prince and Gods in the Kitchen

One of the latest converts to multimedia is the musician who used to be called Prince and currently wishes to be known as an unpronounceable icon (☥). Meaning no disrespect (I'm a fan of His Unpronounceable Purpleness), I'm going to stick with "Prince." Hey, if I wanted to be *really* nasty I could call him by his given name—Roger Nelson.

Prince Interactive is a unique Windows-based combination of music videos, animations, game-type puzzles, and six Prince songs. It's actually a lot like Myst—you wander around a strange place uncovering puzzles and surprises—except instead of Myst's surreal elevator music, you listen to unreleased Prince songs. Play your cards right and you'll be rewarded with a video. If you aren't a Prince fan, though, this title won't be of primal interest to you.

It *is* revealing in terms of where multimedia is going and who's selling it, however. We'll see more CD-ROMs for sale in places like Tower Records, and the content will become more like what's being sold on television talk shows, MTV, and in the general media.

Ancient Wellspring of Adventure

As every good screenwriter knows, there are no new stories—merely old ones with new dressing. The best old stories are myths. Wrath of the Gods, a Windows CD-ROM game from Luminaria, draws its inspiration from this ancient wellspring of adventure. Not only can you live out many of the greatest Greek myths, you can click an Info icon for retellings of the original tales. *And* you get hints from the Oracle. (The Oracle at Delphi was the source of wisdom; in Wrath, it's an icon that pops up as a dippy priestess and gives you game hints.)

The story part of the game is truly superb—and Wrath takes advantage of all the multimedia opportunities: a voice-over dialogue track, a complex set of story branches, and "full-motion" graphics. (Games rarely live up to that billing; most, like Wrath, only manage 5 or 10 frames per second, not the 30 ascribed to real full-motion graphics.)

Unfortunately, the script is a bit contemporary for my taste—would a citizen of ancient Greece use the phrase *chicken out?*—and the voice-over soundtrack plays like amateur theatricals.

Clanks, Bongs, Bells, and Whistles

As a longtime pinball junkie, I've been a bit frustrated with most of the PC pinball simulations I've seen. But no more! Two products from 21st Century Entertainment—last year's Pinball Dreams, and the new Pinball Fantasies—boast a fabulously realistic look and feel. Best of all, these games deliver hair-trigger flipper response. The controls are delightfully simple, too: You use the <Down> key to fire the ball up the slot, press the <Shift> keys to operate the flippers, and bang on the <Space> bar to shove the machine a little (but don't push too much, or you'll end up with the dreaded "tilt").

Both pinball packages come with four "tables." The one problem is that you can't see the whole playing area at once; the screen scrolls to follow the path of the bouncing ball. But scrolling is fast, and pretty soon you won't even notice.

Sucking Bamboo on Swell Street

ZCI's Encyclopedia of Criminal Language (DOS or Windows) is on CD-ROM, but its multimedia components are minimal: a short, spoken intro and a slide show. This reference work is a fascinating dictionary of criminal slang over the last couple centuries. While your career may not turn on knowing that *maggie* means automatic pistol or that in 1812 *living on Swell Street* meant living the good life, this is great stuff. And the next time you go undercover to penetrate a ring of dope smugglers, you might need to know that in 1931 *sucking bamboo* meant smoking opium.

START YOUR ENGINES! Speed Devils is one of the "tables" built into Pinball Fantasies.

- ☥ **Interactive** $59.95; Graphix Zone; 800/828-3838, 714/833-3838
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- **Encyclopedia of Criminal Language** $49.95; ZCI Publishing; 800/460-0444, 214/746-5510
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- **Pinball Dreams, Pinball Fantasies** $49.95 each; 21st Century Entertainment; 716/872-1200
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- **Wrath of the Gods** $59.95; Luminaria; 800/550-0056, 415/821-0536
  Reader service no. 610

Michael Goodwin is a contributing editor for PC World. *He can be reached on PC World Online (see page 12 for contact information).*

By Michael Goodwin

Computer Boob Tubes

The day started with my monitor whining. So I did what any highly trained user would do: I gave it a sharp whack on the side. It worked—the monitor was silent. Unfortunately, now I had what looked like an oscilloscope on screen, sort of a permanent screen saver with nothing to save.

It couldn't have happened at a better time. My 14-inch Sony Multiscan had served me well since 1988, but with so many multimedia apps on my system, I needed more resolution, better color, and maximum performance. And because I spend most of my day in front of the computer, I decided to go whole hog with a 17-inch monitor. Besides, a big monitor definitely helps me write better columns. (I'm trained as a psychotherapist, so I can safely use rationalizations; don't try this on your own.)

Monitor Lizard

I looked at lots of 17-inch monitors, all in the same price and specification range. Now this may come as a surprise—and remember, it's pretty subjective—but at first I didn't see much difference. Yet after I compared them for a month, two stood out from the rest: the ViewSonic 17G and the Sony Multiscan 17se. The ViewSonic's price is low—about $930 on the street. It has excellent color and great on-screen controls. Sony's 17-incher is roughly $1095 discounted and has a Trinitron tube with a deliciously sharp .25-millimeter stripe pitch (equivalent to about a .27mm dot pitch). The result is a bright image with the richest, deepest, most vivid colors I've ever seen.

Which did I choose? I bought the Sony. Though the ViewSonic looked good and its on-screen controls tempting, every Sony monitor I've owned has given me exemplary service. My guess is the Sony will be my one and only, well past the warranty period. And for my money, nothing beats that Trinitron color. • *Sony Multiscan 17se; Sony; 800/352-7669. Reader service no. 601* • *ViewSonic 17G; ViewSonic; 800/888-8583, 909/869-7976. Reader service no. 602*

If you're going shopping, here are the important specs: Find a monitor that's noninterlaced, with a dot pitch of no more than .28mm or a stripe pitch of no more than .26mm (some monitors use dots, others use stripes—it's a techie thing). Remember, the smaller the pitch, the better. Make sure the monitor supports a refresh rate of at least 72 Hz at any resolution you'll be using—with refresh rates, the higher number is better. If you get headaches or feel tired after long periods of looking at the screen, consider getting to the gym more often. In addition, you could try a monitor and video card with a higher refresh rate—remember, both the card and the monitor have to support the higher rate. For details, check out "The Big Picture: 17-Inch Monitors" in April 1994 *PC World*.

The Fine-Tuning Dial

Even if you don't need a new monitor, I'll bet you can substantially improve the display on the one you're using. I've been experimenting with DisplayMate for Windows on every monitor I can lay my hands on. In each case, I've seen an improvement, even if it's only due to correcting brightness and contrast.

DisplayMate is both an adviser and an expert monitor manipulator. The program works by identifying and examining weaknesses in the monitor's settings. It pokes into every nook and cranny, guiding me through adjustments both standard and obscure, including focus, convergence, rotation, and keystoning. Some of these are almost never mentioned in monitors' manuals. The program also has video board controls, including centering, size and height, and the horizontal scan rate.

Don't be surprised if even a new monitor needs an adjustment (on the Sony, I had to set the monitor's black level). So to make sure everything looks just right, I use DisplayMate's Set Up program whenever I change resolution or color mode. Each month or so, I run the Video Obstacle Course to check for drifting. If I move the monitor or change video boards, I use Tune Up, the most thorough of the tests.

And the DisplayMate's Windows interface is smooth, making the program an even better buy; it lets me learn—and adjust—as I go along. To get a taste of the program's power, you can try a demo version of DisplayMate for DOS (unfortunately, not *nearly* as cool as the Windows version), available as DM_DEMO.EXE on PC World Online. • *DisplayMate for Windows $79; Sonera Technologies; 800/932-6323, 908/747-6886. Reader service no. 603*

Getting a new monitor on my desk has helped my writing, all right. Even my editor is impressed. Of course, now I need a fast new video card to keep up with the monitor. Stay tuned.

Contributing Editor Steve Bass is president of the Pasadena IBM Users Group. He can be reached on PC World Online (see page 12 for contact information).

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